

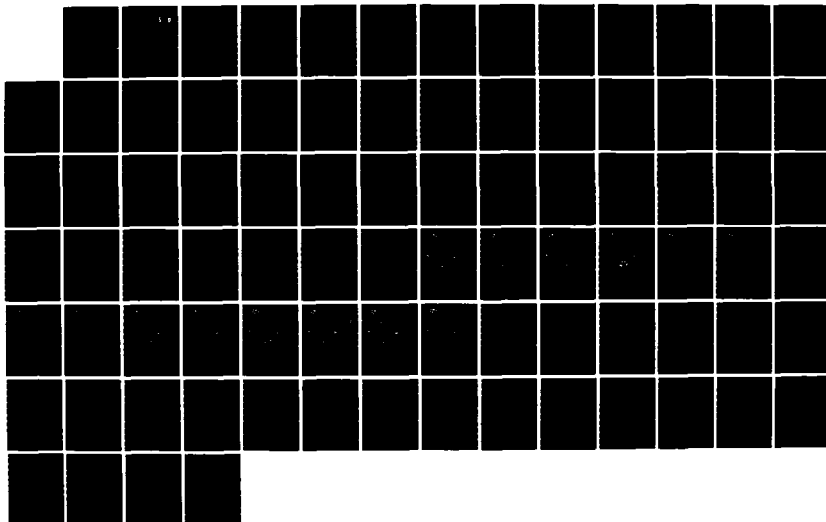
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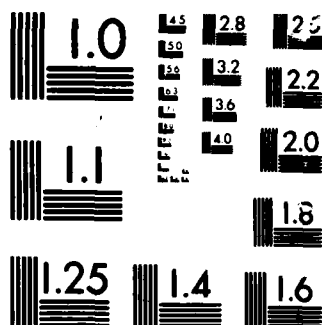
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FIELD ARTILLERY IN SUPPORT OF  
RIVER CROSSING OPERATIONS

A Monograph presented to the Faculty of  
the U.S. Army Command and General  
Staff College in partial fulfillment  
of the requirements for the degree of

MASTER OF MILITARY ART AND SCIENCE

by

Michael T. Chychota, MAJ, USA

B.S., United States Military Academy, 1973  
M.B.A., University of Oklahoma, 1980

Fort Leavenworth, Kansas

1985

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The study concludes that the doctrinal concept of deliberate river crossing is inadequate and the current doctrinal manuals describing the river crossing support doctrine contain vague principles and procedures based upon inadequate concepts. In contrast the World War II principles and procedures provide a sound basis for updating current doctrine.

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## ABSTRACT

FIELD ARTILLERY SUPPORT OF RIVER CROSSING OPERATIONS, by Major Michael T. Chychota, USA, 78 pages.

This study is an historical analysis of the demonstrated Russian and American artillery procedures and principles which were instrumental in the success of river crossing operations during World War II. Each army's concept and doctrine is examined based on the available historical records and contemporary literature and then compared to reveal the similarities and differences. The common principles and procedures are then compared to current American field artillery doctrine for support of river crossings.

The conclusions which could be drawn are that the Russian and the American artillery support doctrines were based on fundamentally different maneuver doctrines but were very similar. Also, when compared to current American artillery doctrine, the American World War II artillery doctrine proved to be more compatible with the supported maneuver doctrine. Today's artillery doctrine is vague and poorly defined because the supported maneuver doctrine is inadequate. Like many support arms, the field artillery may have abrogated its responsibility for developing its own tactical doctrine. The concept of support may have created a situation in which tactics are not emphasized in the field artillery.

The study concludes that the doctrinal concept of deliberate river crossing is inadequate and the current doctrinal manuals describing the river crossing support doctrine contain vague principles and procedures based upon inadequate concepts. In contrast, the World War II procedures and principles provide a sound basis for updating current doctrine.



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## I. INTRODUCTION

Rivers are key military terrain. Defenders see rivers as defensible terrain which form natural lines of resistance while attackers see rivers as natural obstacles which slow or channel movements. Rivers are often the sites of strong defensive positions or delaying actions. Throughout history, armies have waged combat across and at rivers making the importance of offensive river crossings self-evident.

During World War I, the battle in the trenches did not allow rapid mobile combat. Large units did not maneuver very far or very fast, with some notable exceptions on the Eastern Front. In contrast, large unit maneuvers were integral to the rapid mobile warfare of World War II. When large units maneuvered in Central and Eastern Europe, they crossed rivers with great frequency. In order to maintain the initiative and freedom of action, commanders realized that units had to become proficient in crossing rivers. Highly developed standing operating procedures resulted and doctrine evolved with experience.

As the armor and infantry gained expertise, so did the support arms. Except in isolated instances, attacks across river lines were and still are combined arms operations requiring special planning and support. Unfortunately, current American field artillery doctrine for support of attacks across a river line is virtually non-existent. What little doctrine does exist, is vague and poorly described at best.

Current Russian artillery river crossing support doctrine is little changed from World War II. An analysis of Russian and American artillery river crossing support doctrine from World War II could provide a useful framework for American doctrine today.

That Russians and Americans were successful at crossing rivers during World War II is self-evident. They won the war by driving into Germany, crossing many rivers in the process. Examination of the Russian and American methods of supporting river crossings during World War II should yield several common characteristics or principles which were instrumental in achieving success in river crossings. The examination should also show that while superficially similar, the Russian and American doctrines differed in two key areas and, as a result, were fundamentally different. This fundamental difference is the cause of the vague American artillery doctrine. Basing American artillery river crossing doctrine on the common successful World War II principles and correcting the fundamental flaw in American doctrine would produce an effective artillery doctrine for supporting river crossings.

## II. TODAY'S RELEVANCE OF RIVER CROSSINGS

Skill in attacking across river lines is necessary to waging a war in Central Europe. Should the ground forces of the Warsaw Pact ever attack the NATO alliance, a probable, if not the most probable, area of operations will be that of CENTAG. The CENTAG area of operations sits directly astride a traditional invasion route into what is now the Federal Republic of Germany.

Crossed with streams, rivers, and canals, as well as dotted with lakes, the CENTAG area of operations presents a multitude of water obstacles for attacker and defender alike. A unit moving east to west will encounter a water obstacle every three kilometers. Moving north to south, a unit will encounter a water obstacle every five kilometers.<sup>1</sup>

With so many water obstacles in the area, a large force literally cannot move forward, rearward, or laterally without crossing a water obstacle of some type. Therefore, without workable river crossing techniques, units cannot effectively wage rapid mobile warfare in Central Europe.

Generally, three types of attacks on a river line are possible; across an undefended river, across a lightly defended river, and across a heavily defended river.<sup>2</sup> The concepts and principles inherent in attacking across a heavily defended river apply as well to undefended and lightly defended rivers, but in different measure. As a result, only the attack on a heavily defended riverline will be discussed.

The river line is generally accepted as the water's edge on the defender's side of the river, which is termed the far side with respect to the attacker.<sup>3</sup> The attacker's far side is also the location of the exit bank, that spot where the attacker exits the water. Conversely, the entry bank is on the attacker's near side and is the spot where the attacker enters the water.

Most armies throughout history have used a sequential framework for their river crossing doctrine. First, the army

tried to capture a ford, bridge, or other crossing intact. If this opportunity crossing was successful, the army moved on. If this opportunity crossing was unsuccessful, the army tried to force the river from the march before the enemy could set up a coherent river defense. If their hasty crossing was successful, the army moved on. If the hasty crossing was unsuccessful, the army tried to make a deliberate attack across the river.<sup>4</sup>

Doctrine was based on these three sequential goals. During World War II, the Russian and the American armies based river crossing on the same framework. If the attack on a river line is based on traditional principles, then the support of an attack on a river line should also have traditional principles as a basis. An example, showing that such a conclusion is valid, is the Russian doctrine, virtually unchanged from World War II.

### III. THE RUSSIAN METHOD - WORLD WAR II EXPERIENCE

During World War II, the Russians viewed an attack on a river line as simply an attack across an obstacle, which was fundamentally identical to any other attack. The only difference was that the obstacle was filled with water and the physical characteristics of the river determined the river's relative importance as an obstacle.<sup>5</sup> Their attitude evolved through much experience fighting the Germans. Their procedures became more effective through much practice. "During the Vistula-Oder Operations, units of the 3rd Guards and 4th Tank Armies crossed

four rivers in five days - the Czarna, Nida, Pilica, and Warta."<sup>6</sup> The Red Army Field Service Regulations of 1944 made no reference to forcing rivers as special operations which needed special equipment. Instead, the regulations outlined some procedures which pertained only to crossing water obstacles and strongly emphasized those procedures which were inherent in all attacks but were more important in river crossings. In short, Russian offensive river crossings were merely attacks across an obstacle. As a result, the Russian artillery support for river crossings was virtually identical to support for any other attack.

Russian doctrine was not elegant or unique. Their doctrine was simple and effective. There were three types of attacks to force a river line: the opportunity crossing, the attack from the march, and the deliberate attack.<sup>7</sup> The opportunity crossing was the seizure of fords or bridges intact by advance elements against negligible resistance enabling the main body to cross the river without pause.<sup>8</sup> Crossing rivers on the move was the preferred Russian method of overcoming water obstacles.<sup>9</sup> Assault crossings from the march were made when the opportunity crossing failed or was not possible. The assault crossing from the march involved detailed planning and depended upon extensive reconnaissance. A flexible decentralized command structure characterized assault crossings from the march.<sup>10</sup>

Finally, when all else failed or was not possible due to enemy actions or defenses, the Russians made a deliberate attack.

Extensive preparations and minutely detailed plans characterized the highly centralized operations of a deliberate attack.<sup>11</sup> Regardless of the type of attack, the Russians made many simultaneous crossings on as wide a front as possible to gain the largest probability of success.<sup>12</sup> When Marshal Konev's troops forced the Dniepr River in 1944, his soldiers crossed at eighteen sites simultaneously. The Germans counterattacked and eliminated seven of the bridgeheads. The remaining eleven bridgeheads guaranteed Russian success.<sup>13</sup>

The opportunity and assault from the march crossings relied on speed and momentum for success. The deliberate crossing relied on a preponderance of combat power for success. Speed was the key. The Russians made deliberate crossings only when there was no feasible alternative.

#### Artillery Support In General

Russian artillery support for attacks on river lines followed the same three stage framework that characterized Russian maneuver attack doctrine. Period I was the support for the movement forward to attack positions and the preparation. Period II was the support for the attack. Period III was the support for the tanks and infantry in the depths of the enemy defenses and the continuation of the attack.<sup>14</sup> Russian field artillery today operates on a four phase framework which is clearly an expanded version of their World War II doctrine. The only change is the division of the World War II Period I into two separate phases: Phase I, the support for the approach march, and

Phase II, the preparation. World War II, Period II is now Phase III and Period III is now Phase IV.<sup>15</sup>

The primary objective of the Russian artillery was to gain a decided firepower advantage over the enemy in the critical area of the battle. Such an advantage precluded the enemy from bringing effective direct or indirect fire on the assault troops, slowed the movement of enemy reserves, and hindered the launching of an enemy counterattack. The artillery gained fire support superiority by firing surprise, accurate, massed fire and maintained superiority with continuous accurate firing. Normally, the side that fired first with the most guns gained and maintained fire support superiority and provided the supported maneuver commander with considerable freedom of action. Without fire support superiority, the maneuver commander's freedom of action was seriously curtailed.

Sketches A through H illustrate the typical Russian artillery support for an offensive river crossing during World War II. Given a river to cross (Sketch A), the most favorable site for the attack was a reentrant, a place where the river curved toward the attacker.<sup>16</sup> The Russians favored such a location because artillery was able to mass more effectively and fire on enemy positions from the flanks as well as the front, the line establishing the bridgehead was shorter, the flanks of the attacking unit were protected by friendly forces on the river banks, and the enemy defensive area was restricted.



In spite of the Russian preference for attacking across a reentrant, the factors of mission, enemy, and terrain typically determined the crossing site location. Continuous detailed reconnaissance revealed sites with favorable characteristics. However, with all else equal, the Russians generally chose a reentrant as the crossing site.

#### Artillery Support In Period I

Period I, the support of the assault unit movements forward to attack positions and the firing of the artillery preparation, was designed to achieve two purposes. Artillery fire (Sketch B) protected the moving force from visual observation and direct and indirect fire. Artillery provided on call and scheduled screening and blinding fires to limit observation and neutralization and destruction fires to limit direct and indirect fire. During the movement forward, the artillery commander established a command and observation post near the crossing point. From there, the artillery commander could see the entire crossing segment and deep into the enemy position.<sup>17</sup> "All of the artillery of the rifle regiments, some of the gun batteries of the divisional artillery, as well as some of the batteries of the tank destroyer regiments were designated to support the river crossing by the forward battalions and attack echelons of the rifle regiments and their efforts to seize a bridgehead. Artillery positions were set up close to the river to provide flank and oblique fire capability."<sup>18</sup> Additionally, the Russian artillery tried to

destroy enemy command and control facilities, weapons positions, and obstacle systems.

As a general rule, the Russians forced a deliberate river crossing after a thorough neutralization of the enemy defenses.<sup>19</sup> To neutralize the enemy defenses, the Russians fired extremely massive and very short preparations. The preparation (Sketch C) attacked targets throughout the enemy's defenses, concentrating on artillery and anti-tank positions.

The Russians realized how vital was the success of the preparation. In fact, their experience was that the repulse of their first large scale attack during an operation usually led to the failure of the entire offensive.<sup>20</sup> Hence, great pains were taken to insure that the first attack in the main effort area was successful. Overwhelming numbers of artillery pieces moved into the area of the main effort at the expense of other areas. The Germans felt that "...the surest sign of an imminent attack was the identification, through ground or air observation, of Russian artillery elements moving into the front lines."<sup>21</sup>

Despite the mass of artillery, the early Russian hub to hub artillery marathons evolved into extremely intense firepower attacks which lasted only about one hour. Through experience, the Russians found that some defenders invariably lived through the longest barrage. Longer firing times gave the defender more time to determine the true location of the main attack and react. Short massive preparations capitalized upon the initial surprise and confusion of the defender.

Typically, the preparation began with a simultaneous attack by all available assets on the enemy forward positions for several minutes. Every available gun, including heavy machine-guns, fired at their maximum rate on the enemy positions. Without pause, the guns shifted and fired at their sustained rate on targets throughout the depths of the enemy defenses. Long range artillery fired on deep targets. Short range artillery hit the forward positions. After several minutes, all available weapons concentrated again on the forward positions, firing at their maximum rate. The intent was to achieve a fire storm effect at the end of the preparation. Throughout the preparation, artillery used direct lay and direct fire to destroy enemy positions. Practice showed that the artillery preparation was most effective when guns up to 203mm in caliber were brought forward to fire over open sights at the enemy's positions.<sup>22</sup> During one preparation, Russian artillery attacked German batteries and mortars with all guns for twenty minutes, shelled the forward positions and batteries for forty five minutes, and then pounded forward positions and command and observation posts for twenty five minutes, while firing concentrations on mortars and batteries to preclude them from firing.<sup>23</sup>

However intense the preparation, the Russians always made great efforts to deceive and confuse the Germans. The preparation almost never conformed to a pattern with regard to the start time, end time, or conduct of fire.<sup>24</sup> As a result, German defenders were often off balance at the start of the operation.

In order to confuse the enemy as to the moment of the actual attack, the Russian shifted artillery fire to support the feint actions of strong reconnaissance units.<sup>25</sup>

#### Artillery Support In Period II

Period II, the support of the attack, (Sketches D-G) was designed to destroy enemy weapons positions, especially anti-tank defenses, and prevent the enemy from manning their defenses before being overwhelmed by the assault troops. Period II began when the preparation ended and continued until assault troops seized the objective. Normally, one artillery battalion and one anti-tank battalion supported each assault battalion.<sup>26</sup> The artillery firing positions were often near the river crossing entry points or vessel loading areas, which insured responsiveness and range capability, but attracted counterbattery fire.<sup>27</sup> Artillery attacked targets to protect the nose and the flanks of the attack beyond the objective deep into the enemy's rear. Self-propelled guns supporting the attack occupied firing positions in front of the jump off positions of the assault troops to conduct direct aiming and direct fire on the enemy main line of resistance from the very beginning of the attack.<sup>28</sup> During the Dniepr crossing in September of 1943, Cpt. N.A. Anikin of the 197th Guards Artillery Battalion moved his guns to the bank of the Dniepr to better provide direct fire on the enemy. He then crossed the river with the assault echelon and set up his observation post on the far bank.<sup>29</sup>

During the attack, the artillery attempted to box in the crossing sites and isolate the battle area with fires on the flanks and nose of the advancing formations. Standing barriers of high explosive and smoke shells protected the flanks. Successive concentrations and rolling barrages protected the nose. "The Russian artillery entertained a massive fire around their bridgeheads, also from batteries on the flanks, so that all the avenues of attack from the heights down into the river valley became target areas."<sup>30</sup> The advancing troops closely followed a rolling barrage (either single or double) or attacked through a strip barrage to reduce the defender's reaction time. At the River Drut, the Russians crossed before the preparation ended. The Germans did not expect the Russians to appear so soon and many German defenders were overwhelmed in their shelters.<sup>31</sup> From the near bank, anti-tank guns, tanks, assault guns, and regimental artillery continued to bombard the enemy weapons positions point blank.<sup>32</sup>

Light artillery pieces and anti-tank guns would cross as soon as practical; with the assault elements, if at all possible. The object was to get as much artillery across the river as fast as possible to defeat enemy counterattacks and to support the continued offense. The initial Russian bridgehead was usually counterattacked fiercely by the Germans. However, the first wave of Russian infantry brought over sufficient artillery to repel the Germans and ensure the successful continuation of the attack.<sup>33</sup>

Artillery fire not only destroyed or neutralized the enemy, but served to guide the assault troops through the dust, smoke, dark, or fog of many crossings. Illuminating and incendiary projectiles acted as navigational aids and on occasion caused targets to burn. During the fight for Stalingrad, Red artillery attacked specific targets with incendiary shells to cause large fires which served as directional markers to the Russian assault troops crossing the River Don.<sup>34</sup>

Fire control methods were of three basic types. Artillery attacked planned targets throughout the depths of the enemy defenses according to a time schedule. Schedules coordinated the time of firing, the volume of fire, and the shell/fuze combination of each target attacked. Based upon the expected rate of advance of the assault troops, schedules tended to be somewhat inflexible, but had the inherent advantage that reliable communications with the assault echelon were not necessary. The assault echelon knew where and when the artillery would fire so continuous dependable communications with the artillery were unnecessary. Trained observers with good views of the target area were not necessary either. Rolling barrages on the nose of the attack moved at the estimated rate of the assault troops. Successive concentrations shifted according to time. A prime disadvantage to the scheduled fires was that if the infantry and armor lagged behind the barrage at all, the assault echelon had no indirect artillery support, as the barrage rolled off into the enemy positions.

Artillery also attacked planned targets and maintained fire on the targets until the assault echelon signalled that they wanted the fire lifted or shifted. Assault forces controlled successive concentrations and standing barrages the same way.

Lastly, artillery fired some planned targets on command. Such on call targets decreased artillery response time because artillery units had already calculated the firing data and coordinated the method of attack.

Fires on unplanned targets or targets of opportunity were uncommon. Typically, the self propelled artillery and assault guns accompanying the assault elements attacked targets of opportunity. However, when the situation warranted, the artillery massed the fires of many battalions to neutralize resistance in particularly stubborn enemy positions. During the Vistula-Oder Operation, the Germans stubbornly defended a position in a town called Grabow. Russian artillery massed the fires of three artillery brigades, firing 1,150 shells in five minutes.<sup>35</sup> German resistance in Grabow ceased.

Fully expecting that some defensive positions would survive the preparation and initial concentrations, the Russians relied heavily on assault guns and self-propelled artillery for close continuous fire support for the assault echelon. Under conditions of limited visibility, individual gun crews drove up to enemy strongpoints and engaged them at point blank range. <sup>36</sup>

Close coordination between the assault echelons and the artillery was extremely important, especially during river crossings. To facilitate coordination, the artillery commander located himself with the tank or infantry commander. The Russian concept of artillery support differed from that of American support. Asking for support was admitting weakness. Therefore, higher headquarters sends down the plans allowing the infantry, armor, and artillery commanders to work out minor details and exchange information.<sup>37</sup> The artillery commander crossed the river with the assault force commander and ordered his guns to concentrate their fires on the positions which most hindered the assault.<sup>38</sup>

#### Artillery Support In Period III

Period III, the fires in support of the tanks and infantry in the depths of the enemy defenses, was designed to weight the most successful area with artillery support and support the continued offense. Artillery attacked weapons positions and concentrated fires on the nose and flanks of the attack. The primary purpose was to break up the German counter-attacks and protect the assault force from direct and indirect fires. Period III began when assault troops seized the objective and continued until the offensive ended.

Rapid advances sometimes caused meticulously prepared artillery schedules to be modified. Artillery unit commanders, moving with the assault echelons, used pre-arranged signals and



codes to adjust their fire plans. Fire plans were often based upon vague data and oriented on prominent terrain features.<sup>39</sup>

Artillery which accompanied the tanks and infantry deep into the enemy defenses was usually silent during the artillery preparation and initial firing.<sup>40</sup> In essence, the artillery was in reserve. The very idea of artillery in reserve was and is abhorrent to American artillerymen who never seem to have enough guns. To the Russians, silent artillery made good sense. Silent artillery did not usually draw counterbattery fire, especially when other units were firing. As a result, few guns were damaged by enemy fire. Silent artillery did not expend ammunition. Ammunition trucks and racks remained full. Silent artillery did not exhaust gun crews. Men rested as much as possible given the situation, and were not pumping out round after round maintaining a given rate of fire. Granted, silent artillery did not inflict damage on the enemy, but silent artillery assembled in march column went into battle right behind the tanks and infantry with full fuel tanks, full ammunition racks, rested gun crews, and relatively undamaged guns and provided continuous close support. Such support probably would not have been possible, or would have been seriously degraded, if the accompanying artillery had fired during the preparation and the initial firing.

#### Key Russian Principles

In essence, the Russian artillery support for offensive river crossings was identical to the support of any other attack with relatively minor exceptions. Several artillery procedures

or principles clearly were instrumental in achieving a successful river crossing.

- a. The artillery support plans were phased operations which paralleled the phased operations of the supported tanks and infantry.
- b. The forcing of a river line was simply an attack across a water filled obstacle and was conducted just like any other attack.
- c. The detailed fire plans prepared artillery units to fire on targets throughout the operation, as far into the foreseeable future as possible. Scheduled fires throughout the operation combined with on call fires and fires on targets of opportunity to provide flexibility and reliability to the fire plans.
- d. The concealed movements of artillery to the forward positions allowed the guns to deliver massed surprise fire on the enemy positions.
- e. The direct aiming fires and direct fires delivered by the self-propelled artillery and assault guns, neutralized targets of opportunity and gave the tanks and infantry close continuous fire support.
- f. The short, intense surprise fire of the preparation gained fire support superiority and neutralized the enemy defenses.
- g. The location of the artillery commander with the tank or infantry commander made close continuous rapid coordination possible.
- h. The artillery support of feints and demonstrations augmented the deception plan and confused the enemy.
- i. The reserve artillery which accompanied the assault and exploitation forces was initially silent, which allowed them to go into battle fully prepared.

Many of the principles or procedures characteristic to Russian artillery support of river crossings in World War II had similar counterparts in American artillery doctrine.

#### IV. THE AMERICAN METHOD - WORLD WAR II EXPERIENCE

During World War II, the American commanders viewed attacks on river lines as special operations which required special planning and special equipment. The concept was totally focussed on crossing the river. The river crossing ostensibly was not an end in itself, but the operation ended when the bridgehead was secure.<sup>41</sup> Americans felt that crossing the river was the operation and not part of the operation.

American maneuver doctrine for attacking a river line was based upon a three phase framework. Each phase was expressed as an objective. Moving to attack positions was necessary and was called preparation for the attack. The phases of the river crossing began at the line of departure and ended when the bridgehead was secure. Exploitation of success or pursuit of the enemy was considered a separate operation, not a logical extension of the crossing.

The Americans, like the Russians, wanted to seize an existing crossing or ford, if at all possible. If that was not possible, they attacked as quickly as possible before the enemy could set up an effective defense. However, the American division had very little organic river crossing equipment so the assault crossing from the march was rare. Usually, the Americans made a deliberate attack.<sup>42</sup> The relative merits of hasty versus deliberate river crossings are irrelevant as are the causes of the American tendency toward the deliberate crossing.

That American doctrine developed from experience and was successful is important and relevant.

The doctrinal definitions of Objectives I, II, and III were purposely vague and extremely general in nature. The first phase of the attack across a river line was to cross the river and seize Objective I, which was usually the high ground and terrain in the immediate vicinity of the crossing site. This initial bridgehead prevented the enemy from placing effective direct small arms fire on the crossing site. The second phase was the expansion of the bridgehead to seize Objective II. Objective II was usually prominent terrain from which the enemy could observe the crossing site. Seizure of Objective II prevented the enemy from placing ground observed indirect fire on the crossing site. The last phase was the further expansion of the bridgehead to seize Objective III. Objective III was usually terrain where enemy artillery and rocket units were emplaced or communication centers. Seizing Objective III was called securing the bridgehead and prevented the enemy from placing any type of indirect fire on the crossing site.<sup>43</sup>

#### Artillery Support In General

Artillery doctrine for supporting offensive river crossings organized artillery support into three phases which correlated exactly with Objectives I, II, and III prescribed for the tank and infantry forces. Sketches I through O illustrate a typical American artillery plan for the support of an attack on a river line during World War II.

Given a river line to attack (Sketch I), the first mission of the artillery was to protect the tanks and infantry as they moved forward to the attack positions.<sup>44</sup> Such artillery fire (Sketch J) was not actually included in the river crossing operation but was considered as an action in preparation for an attack.<sup>45</sup> Artillery attacked observation posts and weapons positions which could observe or fire upon the moving units (Sketch J). While the tanks and infantry moved into position, the artillery moved forward by echelon so that there was no halt to the artillery firing and the artillery did not interfere with the tanks or infantry. Artillery units were emplaced as far forward as possible, almost to the river's edge, to provide support for as long as possible and as deep into the enemy position as possible.<sup>46</sup> Correctly emplaced artillery could place concentrated fire on the objectives from defiladed, concealed positions, which allowed flanking fire along the river as well as deep into the enemy's position.<sup>47</sup>

Close continuous coordination between the artillery commander and the tank or infantry commander was extremely important, especially during river crossings. Unlike today, the artillery commander fought his artillery much like the tank or infantry commander fought his tanks or infantry. The artillery commander decided how the artillery would best fight the battle and explained the best method to the supported command who either accepted the artillery plan or requested a modification. The 1944 version of FM 100-5 dictated that "to insure close

cooperation with the attacking troops, artillery units assigned to direct support of designated units maintain(ed) constant connection with supported units through common command posts or by liaison agents."<sup>48</sup> The emphasis during World War II was on common command posts, not liaison agents. The division artillery commander normally located his command post at the division command post. Artillery commanders at each echelon followed his example and usually positioned their command posts at the supported units' command posts.<sup>49</sup> The concept was to provide a method of operation which allowed the artillery commander to fight his artillery in the same way as the tank commander fought his tanks and the infantry commander fought his infantry, with all arms aiming at the same goal in a concerted coordinated effort.

Prior to the attack, artillery supported reconnaissance and deception efforts. By firing on enemy outposts and positions in conjunction with feints or strong reconnaissance actions, the artillery tempted the enemy to disclose the defensive dispositions and defensive fires. Artillery combined with raids and the fire of heavy infantry weapons was effective in conducting reconnaissance by fire.<sup>50</sup>

Typically, immediately before the assault troops attacked, the artillery fired a preparation. The preparation

(Sketch K) was to achieve local, if not general, fire support superiority. Superiority over enemy artillery by either blinding their observation posts or neutralizing their guns, or both, was indispensable to the success of the attack.<sup>51</sup>

Having attained fire support superiority, the artillery could then set about neutralizing the enemy defensive positions and reducing obstacles. Preparations were usually short and violent. A prolonged preparation destroyed the element of surprise and gave the enemy time to react. Preparations were as short as fifteen minutes or as long as several hours with between one and two hours as the norm.<sup>52</sup> Artillery concentrated their fires, usually massing as many battalions as possible for a short extremely intense surprise attack on one target before repeating the procedure on the next target. The attack on each scheduled target in the preparation was treated as a "time on target" attack to achieve the most surprise and the greatest casualty effect. (In a time on target attack, the artillery fire direction centers of several battalions calculate the projectile's time of flight to the target and synchronize the firing of their guns so that the shells from all the units impact at the same time on the target.) The target has no reaction time, cannot flee, or cannot take cover. Each target scheduled in the preparation was treated the same way. Firing on enemy artillery and mortar positions, observation posts, command and control facilities, reserve locations, logistical sites, and forward elements, the artillery tried to neutralize enemy defenses and

deny enemy visual observation of the battlefield from enemy adjacent and rear units.<sup>53</sup> Combined with the fire of the artillery, the direct fire of tanks and tank destroyers pounded the forward enemy positions.<sup>54</sup>

#### Artillery Support In The Advance To Objective I

Once the artillery achieved fire support superiority, the assault forces attacked across the river to seize Objective I. The importance of fire support superiority at this stage cannot be overemphasized. Losing the battle on the near shore meant losing the battle for the river crossing. At the Rapido River in 1945, the American artillery failed to silence or even suppress the German artillery. The German artillery decimated the American assault troops moving to enter the river, punctured and sank the assault boats, destroyed the bridges, and generally broke up the assaults.<sup>55</sup>

As the assault forces advanced on Objective I, they first made the assault crossing (Sketch L). Artillery, tanks, and tank destroyers fired on enemy positions from which the enemy could see or fire on the crossing site. The tanks and tank destroyers provided flat trajectory direct fire which was useful for destroying strong points and dug in weapon positions in the forward lines. Artillery provided high trajectory fires for counterbattery and smoke for screening or blinding missions. The direct support artillery typically fired a rolling barrage to lead the assault and successive concentrations to neutralize weapon positions. General support artillery fired concentrations



on enemy artillery and mortar positions, reserve assembly areas, and movement routes into the bridgehead.<sup>56</sup> The artillery used HC smoke to screen the assaulting platoons. When the infantry reached the screen, the artillery shifted to a successive target.<sup>57</sup>

During the attack (Sketch M), artillery close support concentrated fires where the assault forces made the greatest progress. The purpose of the close supporting fires was to prevent the enemy from manning the defensive positions in time to meet the attack effectively.<sup>58</sup> Varying the time interval between successive artillery attacks on a given enemy position proved to be very effective. The enemy stayed in the bunkers longer when there was no set pattern to the shelling. As the last artillery volley landed, the assault troops made their final assault against much reduced resistance.<sup>59</sup> Prearranged signals or time schedules normally controlled the shifting of artillery fires from one target to another.<sup>60</sup> Forward observers with the assault echelons adjusted indirect fire onto important targets of opportunity, usually shifting from a planned target or prominent terrain features.

A dilemma confronted the forward observers in all attacks, but especially in river crossings. The dilemma was where to emplace their observation post. If they set up where they could view the enemy positions and the crossing site, they were not with their supported company commanders. If they crossed with the company commanders, they usually could see only

a very small sector and, often pinned to the ground, could not see anything and could not perform their mission.<sup>61</sup>

The liaison officer typically became an overall observer, located where he could see deep into the enemy position and the entire crossing site and coordinated the movements and activities of the observers.

#### Artillery Support In The Advance To Objective II

Once Objective I, the elimination of effective direct small arms fire on the crossing site, had been achieved, the engineers began building bridges and the assault troops began to advance on Objective II. Objective II was the seizure of terrain which prevented enemy ground observed indirect fire on the crossing site. As the assault waves advanced from Objective I, the artillery displaced by echelon across the river.<sup>62</sup> The intent was to provide continuous artillery support while attempting to get artillery into the bridgehead as rapidly as possible, to defend against enemy counterattacks and to keep the advancing units within the range of friendly artillery.<sup>63</sup>

During the advance on Objective II, the elimination of ground observed indirect fire on the crossing site (Sketch N), artillery made the maximum use of all available shell/fuze combinations. These included smoke and high explosive screens in front of and on the flanks of the assault forces; time fuze high explosive fire on enemy positions; and delay fuze high explosive fire on roads, intersections, and earthen bunkers. Planned successive concentrations impacted, lifted, and shifted in

accordance with requests from supported unit commanders.<sup>65</sup> Scheduled fires never seemed to keep pace with assault troops, so some type of on call control was typical. The Americans found "...through practice that a series of phase lines with selected concentrations in each phase, gave the best results."<sup>66</sup> Such fires were easy to control and conformed well to the infantry rate of advance. Artillery fire concentrated on roads perpendicular to the axis of advance as this is where enemy tanks and anti-tank guns would take up defensive positions.<sup>67</sup> Interdicting and harassing fire was definitely worthwhile. At Cervaro, critical points were selected from map, air photo, and S2 report study. The artillery then attacked the supply dumps, transfer points, intersections, and defiles. German POWs stated that supplies had been cut off by American artillery and they had eaten nothing for several days.<sup>68</sup>

The actual fires in support of the attack were of two types: accompanying fire and protective fire. Accompanying fire prevented the enemy from manning defensive works in time to meet the assault. Accompanying fire was in direct support of the assault elements and was mainly scheduled or on call. Protective fire attacked those points in the attack zone, from which, the enemy could observe or fire on the assault units. The intent was to "protect" the assault units from counterattacks and long range/flanking fires.<sup>69</sup> Smoke and high explosive were the common shells of choice.

### Artillery Support In The Advance To Objective III

Once the advance elements secured Objective II, the advance to seize Objective III began. Objective III, (Sketch D) the elimination of all indirect fire on the crossing site, determined the security of the bridgehead. Attacking units forced the bridgehead to expand, much like a bubble, outward from the crossing site, forcing enemy artillery units to displace to positions from which they could not range the crossing site. Artillery methods and procedures during the advance on Objective III were identical to those during the advance on Objective II. Once Objective III was secured, the river crossing operation ended and the unit could then begin far bank operations as appropriate.<sup>70</sup>

### Key American Principles

In essence, the American artillery doctrine for support of offensive river crossings was very effective and was designed to support a special type of operation. Several artillery procedures or principles clearly were instrumental in achieving a successful river crossing.

- a. The artillery support plans were phased operations which correlated to the phased operations of the supported tanks and infantry.
- b. The detailed fire plans scheduled artillery units to attack targets throughout the operation, as far into the foreseeable future as possible. Scheduled and on call fires combined with targets of opportunity to provide reliability and flexibility to the fire plans.

- c. The concealed movements of the artillery to forward positions enabled the guns to deliver massed surprise fire on the enemy positions.
- d. The direct fires of tanks and tank destroyers augmented the artillery and destroyed individual enemy weapons positions.
- e. The short, intense, surprise fire of the preparation gained fire support superiority and neutralized the forward enemy defenses.
- f. The location of the artillery commander with the tank or infantry commander made close continuous rapid coordination possible.
- g. The artillery support of feints and demonstrations augmented the deception plan, confused the enemy, and gained information through reconnaissance by fire.

#### V. SUMMARY OF WORLD WAR II EXPERIENCES

A quick summary and comparison of Russian and American artillery doctrines for supporting river crossings during World War II reveals that several principles or procedures were common to both. The artillery doctrines organized the support into phased operations which used the fires of tanks to augment the artillery, included short intense preparations, attacked scheduled targets deep in the enemy rear, and supported feints and demonstrations in addition to the main effort. The artillery commander located his command post at the supported maneuver unit's headquarters and closely coordinated the artillery support and artillery movements.

However, two key principles were different. The two differences reflected the fundamental conceptual difference between the Russian and American doctrines. American doctrine defined river crossings as special operations needing special

planning and special equipment. Russian doctrine defined river crossings as simply attacks across obstacles. Russian artillery was therefore organized and employed to rapidly cross the obstacle and continue the operation. That explains why the Russians used reserve artillery. The Americans saw no need to reserve artillery to continue the offense after crossing the river, for crossing the river was the operation. What superficially seemed to be similar doctrines were fundamentally different, yet employed several common principles or procedures.

#### VI. AMERICAN RIVER CROSSING DOCTRINE EVOLUTION SINCE WORLD WAR II

American maneuver river crossing doctrine has essentially remained unchanged since World War II. FM 90-13 River Crossing Operations defines an attack on a river line as a special operation which requires special planning and special equipment.<sup>71</sup> The current American four phase operation for crossing rivers is simply a redefinition of the three World War II objectives. FM 90-13 River Crossing Operations now defines the four phases of a river crossing as Phase I, the advance to the river; Phase II, the assault crossing; Phase III, the advance from the exit bank; and Phase IV, the securing of the bridgehead.<sup>72</sup> There is basically no difference in the maneuver doctrine.

American artillery doctrine has not been as stable. In fact, field artillery doctrine has changed and become almost unrecognizable. FM 6-20 Fire Support In Combined Arms Operations does not describe artillery support for river crossings and does not explain planning principles or execution procedures for river crossings. The entire river crossing section is extremely vague and does little more than list pearls of wisdom to consider. The artillery doctrine for supporting river crossings, which was fairly clear and succinct in World War II, seems to have disappeared. The American field artillery has lost the lessons of World War II river crossings.

On the other hand, Russian doctrine has been refined and solidly entrenched. River crossings are important. Every soldier must be proficient in crossing rivers, but rivers are only obstacles and obstacles are to be crossed, as quickly as possible to get to the objective.

The Russian conceptual attitude is different from the American. In his book, Red Armour, Richard Sumpkin stated, "The Soviet attitude to the crossing of water and other obstacles is diametrically opposed, at psychological and tactical levels alike, to the Anglo-American attitude of the Second World War and since. The Soviets recognize the importance of getting across obstacles but do not make much of a song and dance about it. The Anglo-Americans insist on a three or four phase deliberate operation."<sup>73</sup>

The Russian maneuver doctrine for crossing rivers has evolved in a manner similar to American maneuver doctrine. The big difference is that their artillery doctrine evolved with their maneuver doctrine. Today, Russian artillery doctrine correlates exactly to maneuver doctrine and with minor changes in wording is essentially the World War II doctrine. American artillery doctrine is vague and not well correlated to the existing fundamentally inadequate maneuver river crossing doctrine.

Both the Americans and the Russians combined the fires of mortars, rockets, and aircraft with artillery to neutralize the enemy. The concept of synchronizing all available means of fire support was well known. However, the details of such coordination and synchronization is well beyond the scope of this paper and only artillery fires are examined.

Despite the difference in attitude, the American and Russian procedures and techniques for conducting offensive river crossings have several similarities. The basic sequence of operations is identical. In a typical river crossing, the attacker first assault swims vehicles or rubber boats carrying assault troops across the river. Second, the attacker assembles tactical rafts to carry crew served weapons and small artillery pieces across the river. Lastly, the attacker builds bridges, across which the remainder of the force moves.<sup>74</sup>

Several principles apply equally to Russian and American river crossing doctrine. If a water obstacle is encountered, the attacker attempts to cross the obstacle with a minimal loss of



speed and momentum. If an opportunity crossing is not possible, then the attacker makes a hasty crossing. If a hasty crossing is not possible, then the attacker makes a deliberate crossing. If the crossing is to have a reasonable chance of success, then the attacker incorporates additional measures, such as deception, feints, smoke screens, propaganda, electronic warfare into the attack plans.<sup>75</sup>

Since American and Russian World War II maneuver doctrine for attacking a river line was very similar, the logical conclusion is that American and Russian WWII artillery doctrine would be similar and indeed they were. Many of the characteristics of Russian artillery support had counterparts in American artillery doctrine. The problem arises when current doctrine is examined.

#### V. ANALYSIS

Soviet river crossing doctrine and the artillery support doctrine is virtually unchanged since World War II. The same phases of artillery support and the same principles of crossing appear in World War II and current Soviet doctrine. The names are different in some cases, but the content is identical.

Using the same reasoning, since American maneuver doctrine has not changed, American field artillery doctrine should not have drastically changed. However, thorough reading of the current FM 100-5 Operations and FM 6-20 Fire Support In Combined Arms Operations provides no hint of what the current field artillery doctrine is for supporting river crossings.

FM 90-13 River Crossing Operations describes a four phase operation for attacking across rivers.<sup>76</sup> The four phases are very similar to the three World War II objectives.

Phase I, the advance to the river, is very similar to the American preparation for the advance to seize Objective I during World War II. The objective of Phase I is to build up the necessary combat power on the near bank undetected by the enemy and unhindered by enemy actions.

Phase II, the assault crossing, takes place on a wider front than ordinary attacks and is made as rapidly as possible. The intent is to project the greatest amount of combat power across the river in the shortest possible time. More friendly force must reach the far shore faster than the enemy can concentrate and defeat the attack. The exit bank must be cleared to a distance which precludes effective enemy small arms fire on the crossing site.<sup>77</sup> The current American Phase II is identical to the World War II American Objective I.

Phase III, the advance from the exit bank, is an advance from the crossing areas to objectives within the proposed bridgehead.<sup>78</sup> The purpose of the bridgehead objectives of Phase III is never explained, which is probably an oversight. During World War II, once the Americans seized Objective I, they advanced to Objective II, which precluded effective enemy ground observed indirect fire on the crossing site. Today's Phase III and the World War II Objective II are very likely the same.

Phase IV, the securing of the bridgehead, is the seizure of terrain or communications centers which must be controlled to insure the force's security and facilitate future operations.<sup>79</sup> Selection of the objectives to secure the bridgehead is based upon the enemy, situation, troops available, time and terrain.<sup>80</sup> However, nowhere in FM 90-13 River Crossing Operations is a discussion of what constitutes insuring the force's security and facilitating future operations. During World War II, American doctrine dictated that seizure of Objective III, which is probably the forerunner of the current Phase IV, precluded the enemy from placing indirect fire on the crossing site.

Despite the caveat that "...offensive river crossings are not an objective in themselves, but a part of the scheme of maneuver and overall offensive action to defeat the enemy," FM 90-13 River Crossing Operations contains no discussion of the continuation of the offensive.<sup>81</sup> The last phase of the operation is securing the bridgehead.<sup>82</sup> Obviously, if the river crossing is not an end in itself, then the last phase of the crossing should be the continuation of the offense. This conceptual difference causes the divergence of Russian and American doctrine. American maneuver river crossing doctrine is not consistent because of the special operation concept. No other obstacle is crossed using a special operation with special planning and special equipment. Obstacles are crossed as quickly as possible in route to the objective.

Because American maneuver river crossing doctrine is inconsistent, the artillery doctrine supporting river crossings is vague. FM 6-20 Fire Support In Combined Arms Operations claims to be the sole source document in the how to fight manual series for the combined arms commander for the use and coordination of fire support.<sup>83</sup> However, FM 6-20 Fire Support In Combined Arms Operations refers to FM 90-13 River Crossing Operations for a "detailed discussion of river crossings" and lists points to ponder.<sup>84</sup> Some of the points are statements of the blatantly obvious. Some are confusing. One such point is, "The width of crossing areas will affect planning."<sup>85</sup> There is no discussion of how or why crossing area width affects artillery planning. There is no discussion of the value of the effects. There is no discussion of how to overcome or augment the effects. All seventeen points to ponder suffer from the same type of problem.

In the absence of any effective well defined doctrine, the reasonably prudent field artilleryman would study river crossing operations of past wars and formulate conclusions on how to effectively support attacks on river lines. By comparing the operations of the Russians and Americans during World War II and realizing that river crossings are simply attacks across water obstacles, nine principles stand out as instrumental in achieving success.

- a. The artillery support plans should be phased to correlate exactly with the maneuver plans. The maneuver and support arms' doctrine should be identical. Currently, the artillery doctrine is not correlated well with the maneuver doctrine.

- b. The support of an attack on a river line should be planned and executed exactly as the support of any other attack. The water obstacle should cause no excessive concern about special operations needing special equipment and planning. If American maneuver and artillery doctrine were consistent, the engineers would breach a minefield and the assault forces would form a "minefield head" in phased operations. The attack across a river line should be considered as simply an attack across a formidable obstacle, not a special operation.
- c. The detailed artillery support plans should include scheduled and on call fires throughout the operation and have some method of organizing the fires. Currently, the American artillery does not emphasize scheduled deep fires, paying much more attention to suppressing targets of opportunity. As recently as 1982, a student text on fire planning dictated that scheduled and on call fires should be planned throughout the operation; specifically, to protect the assault forces moving forward to the line of departure, to neutralize defenses and protect the assault forces advancing from the line of departure to the objective, to neutralize the enemy defenses on the objective, and to suppress weapons positions and enemy groupings beyond the objective and to the flanks of the attacking forces.<sup>86</sup> No such guidance exists in current artillery doctrinal manuals, yet the guidance seems to be quite logical and effective. Both the Russians and Americans used similar methods during World War II.
- d. The artillery movements forward should be concealed from the enemy. Such a self evident statement need hardly be discussed in much detail. Yet the current FM 6-20 Fire Support In Combined Arms Operations does not even mention the need for concealed movements of artillery, despite the fact that movements of artillery forward are critical during river crossings, and if discovered, reveal the crossing area to the enemy.
- e. The fires of tanks should augment the fires of the artillery during the early stages of the river crossing. Flat trajectory fires from tanks on individual enemy strong points greatly increase the effect of the preparation and initial support fires. Current American artillery manuals do not prescribe using tank fire to augment artillery fire plans, yet tanks and tank destroyers commonly fired with the artillery in World War II.

- f. The artillery preparation to neutralize enemy positions and gain fire support superiority should be extremely intense, accurate surprise fire which lasts a relatively short time. Despite how critical local fire support superiority is in river crossings, the current FM 6-20 Fire Support In Combined Arms Operations does not prescribe a suggested length or even mention how the preparation reveals the location of the main attack to the enemy.
- g. The artillery commander should position himself with the supported unit commander during the river crossing to insure rapid continuous coordination of artillery support. Current artillery doctrine dictates that a fire support element or liaison officer locates with the supported unit commander. During World War II, the most effective method was to collocate the artillery and the tank or infantry command posts. The commander coordinated while the liaison officer was a centrally positioned observer who could view the entire crossing site and the enemy defenses.
- h. The artillery should support feints and reconnaissance action with the same intensity and ingenuity as in actual attacks. The intent is to deceive the enemy and gain information about the defensive positions and defensive fires. Even though deception is of tantamount importance to supporting river crossings, there is no mention of artillery support of deceptions or feints in river crossing operations in FM 6-20 Fire Support In Combined Arms Operations.
- i. The artillery which accompanies the assault and exploitation forces should remain silent during the preparation and support for the initial stages of the attack. The artillery would enter the battle fully prepared and relatively undamaged. At present, the American artillery community does not recognize artillery in reserve waiting to be committed and has no doctrine describing the employment of accompanying artillery for assault or exploitation forces. A deep penetration following a rapid river crossing almost dictates a need for some type of accompanying artillery. The concept of accompanying artillery is not in American doctrine.

### VIII. CONCLUSIONS

River crossing operations are important offensive actions in a ground war in Europe. The American army must be proficient in conducting river crossings, in order to maintain the initiative and freedom of action. Effective field artillery support is an integral part of successful river crossings. However, current American artillery doctrine for supporting river crossings is virtually non-existent and what does exist is vague.

The Americans and Russians during World War II had valid artillery doctrines for supporting river crossing operations. Examining the Russian and American artillery doctrine of World War II reveals some principles and procedures which were instrumental in achieving successful river crossings. The instrumental principles or procedures were to:

- a. phase the artillery doctrine exactly as the maneuver doctrine,
- b. treat the attack across a river line as any other attack across an obstacle and not as a special operation requiring special planning and special equipment,
- c. prepare detailed fire plans which scheduled targets to be fired throughout the operation into the depths of the enemy defenses and combine scheduled targets with on call targets and a minimum of targets of opportunity,
- d. conceal the movements of the artillery and place massed surprise fire on the enemy if at all possible,
- e. augment the artillery indirect fire with tank direct fire to more effectively neutralize enemy positions,
- f. fire short massive surprise preparations to gain fire support superiority and neutralize enemy defenses,

- g. position the artillery unit commander with the supported tank or infantry commander to coordinate closely and continuously,
- h. support feints, demonstrations, and raids with artillery fire to augment the deception plan, confuse the enemy, and conduct reconnaissance by fire, and
- i. keep some artillery in reserve to accompany the assault or exploitation forces and provide close continuous support deep into the enemy's position.

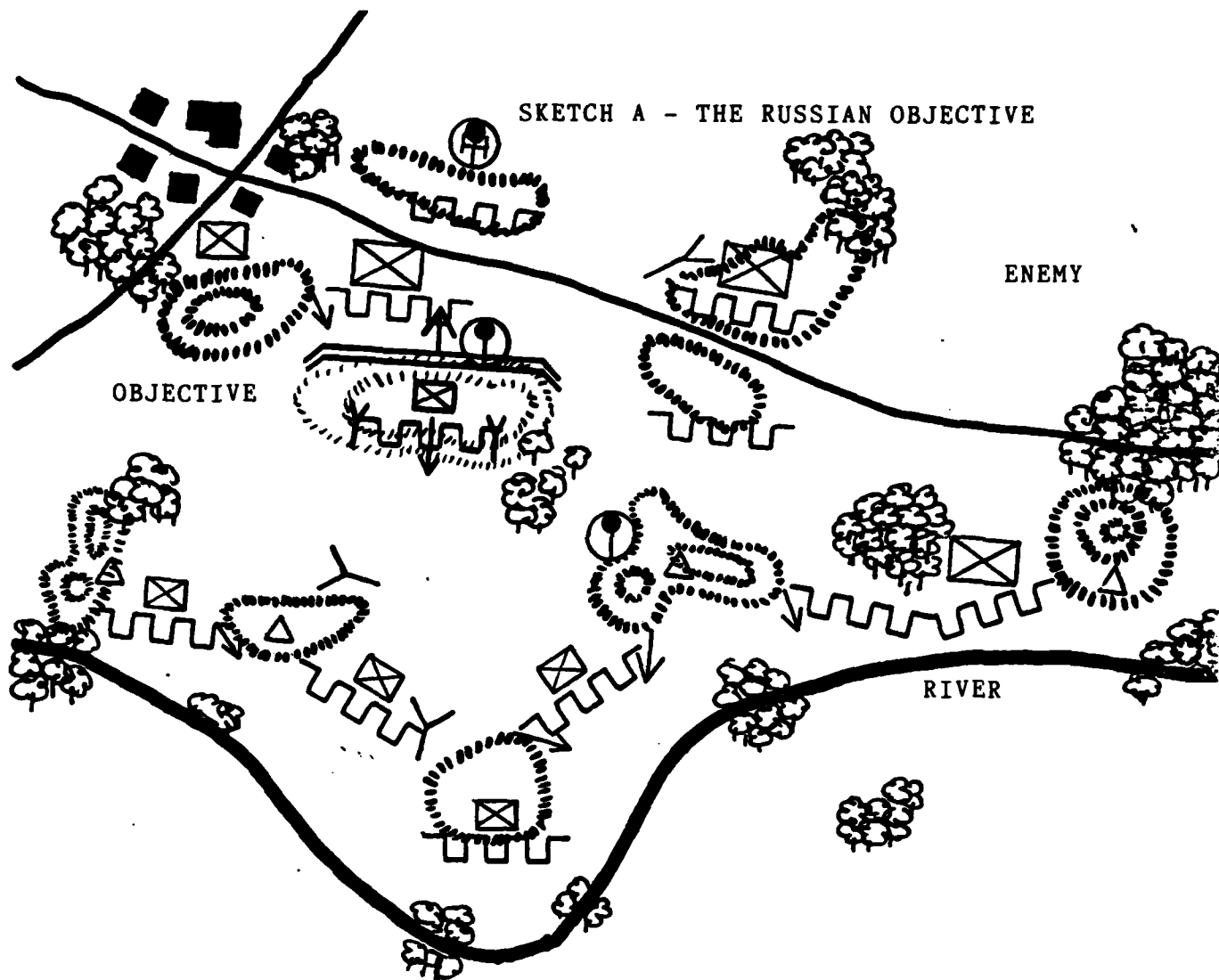
The revision of American field artillery doctrine for the support of river crossing operations first requires the revision of the American maneuver river crossing doctrine. The artillery doctrine can only be as effective as the maneuver doctrine to be supported. If the maneuver doctrine were revised to something approaching the Russian concept, in that river crossings are not special operations, then the effective principles or procedures of the World War II artillery doctrines would serve very well as a basis for current American artillery river crossing doctrine. Only a coordinating agency would be needed to write the principles in FM 90-13 River Crossing Operations, FM 71-100 Armored And Mechanized Infantry Division Operations, and FM 6-20 Fire Support In Combined Arms Operations so that the principles would be identical in each manual.



**APPENDIX A**

**SKETCHES OF TYPICAL  
WORLD WAR II RUSSIAN AND  
AMERICAN RIVER CROSSING  
ARTILLERY SUPPORT**

# SKETCH A - THE RUSSIAN OBJECTIVE



ENEMY

OBJECTIVE

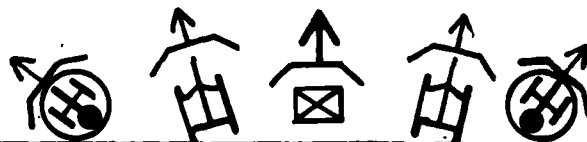
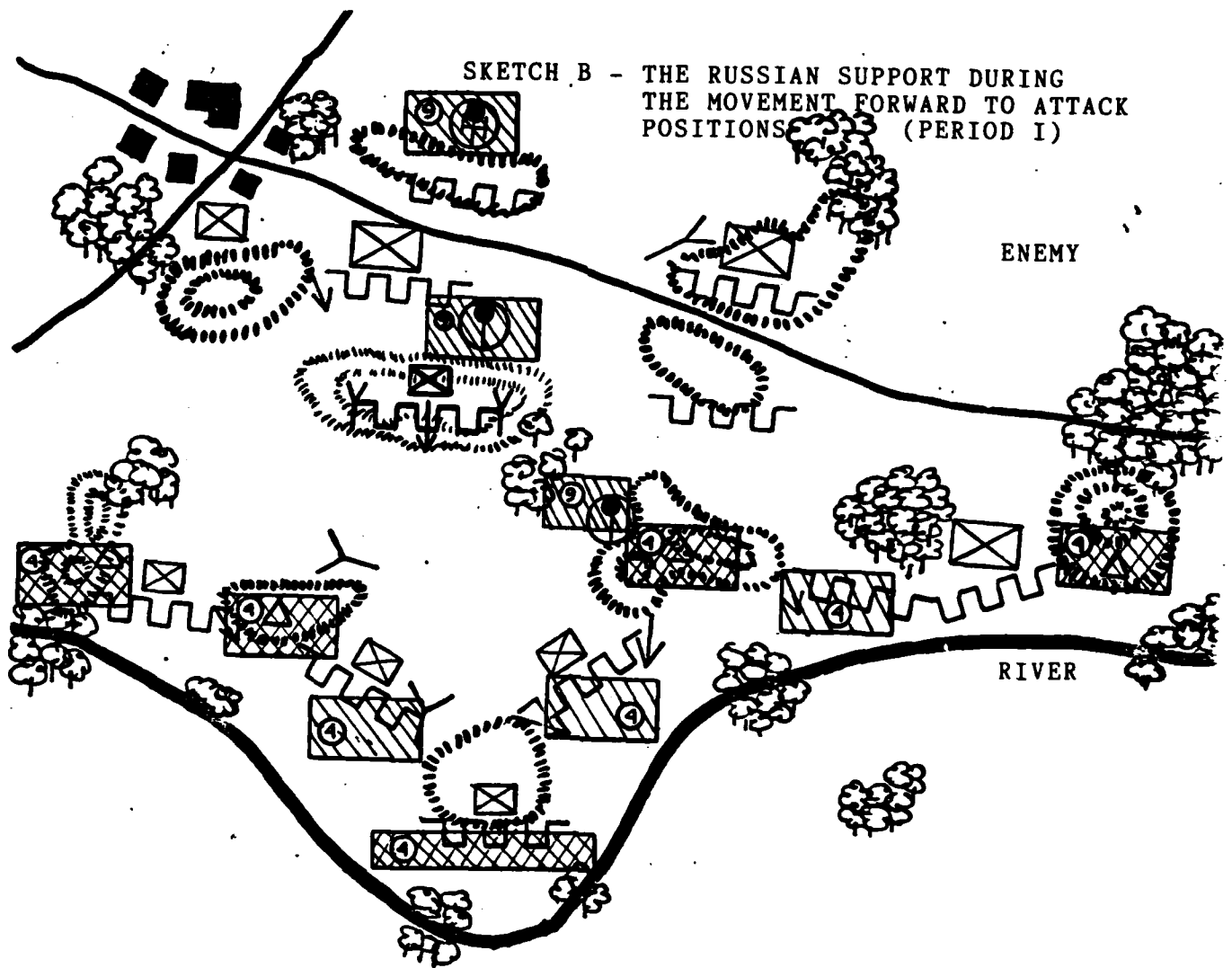
RIVER

RUSSIANS

THIS LEGEND PERTAINS TO ALL SKETCHES, BUT NOT ALL SYMBOLS ARE USED ON EVERY SKETCH, WHILE SOME SYMBOLS ARE USED MORE THAN ONCE.

	HOWITZER BATTERY		TRENCHLINE		① DIRECT AIMING FIRE
	MORTAR BATTERY		INFANTRY		② DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK		③ FIRE ASSAULT
	TANK COMPANY		BRIDGE		④ FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE		⑤ SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE		⑥ MASSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE		⑦ ROLLING BARRAGE FIRE
					⑧ STANDING BARRIER FIRE
					⑨ COUNTERBATTERY FIRE

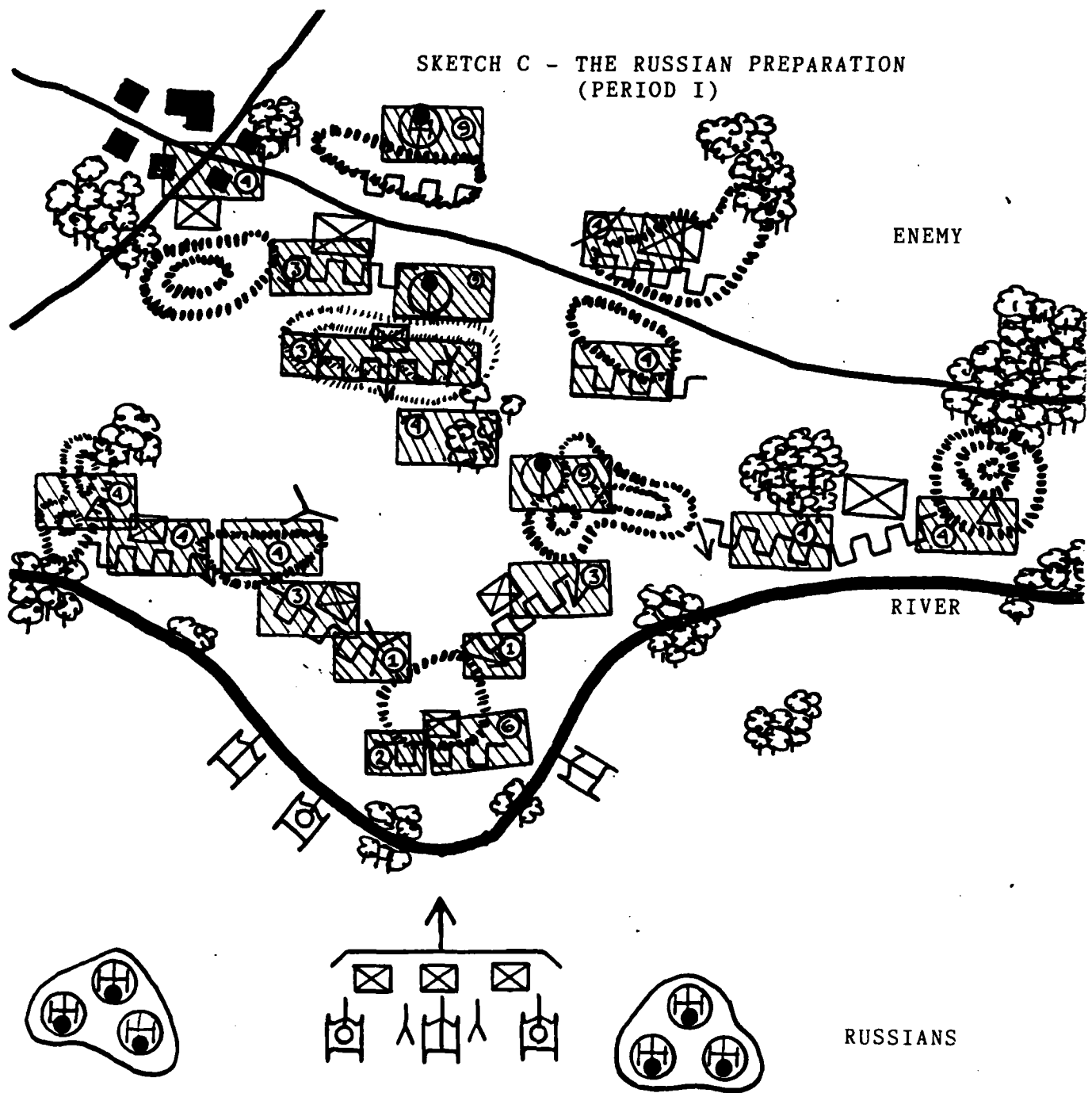
SKETCH B - THE RUSSIAN SUPPORT DURING  
THE MOVEMENT FORWARD TO ATTACK  
POSITIONS (PERIOD I)



RUSSIANS

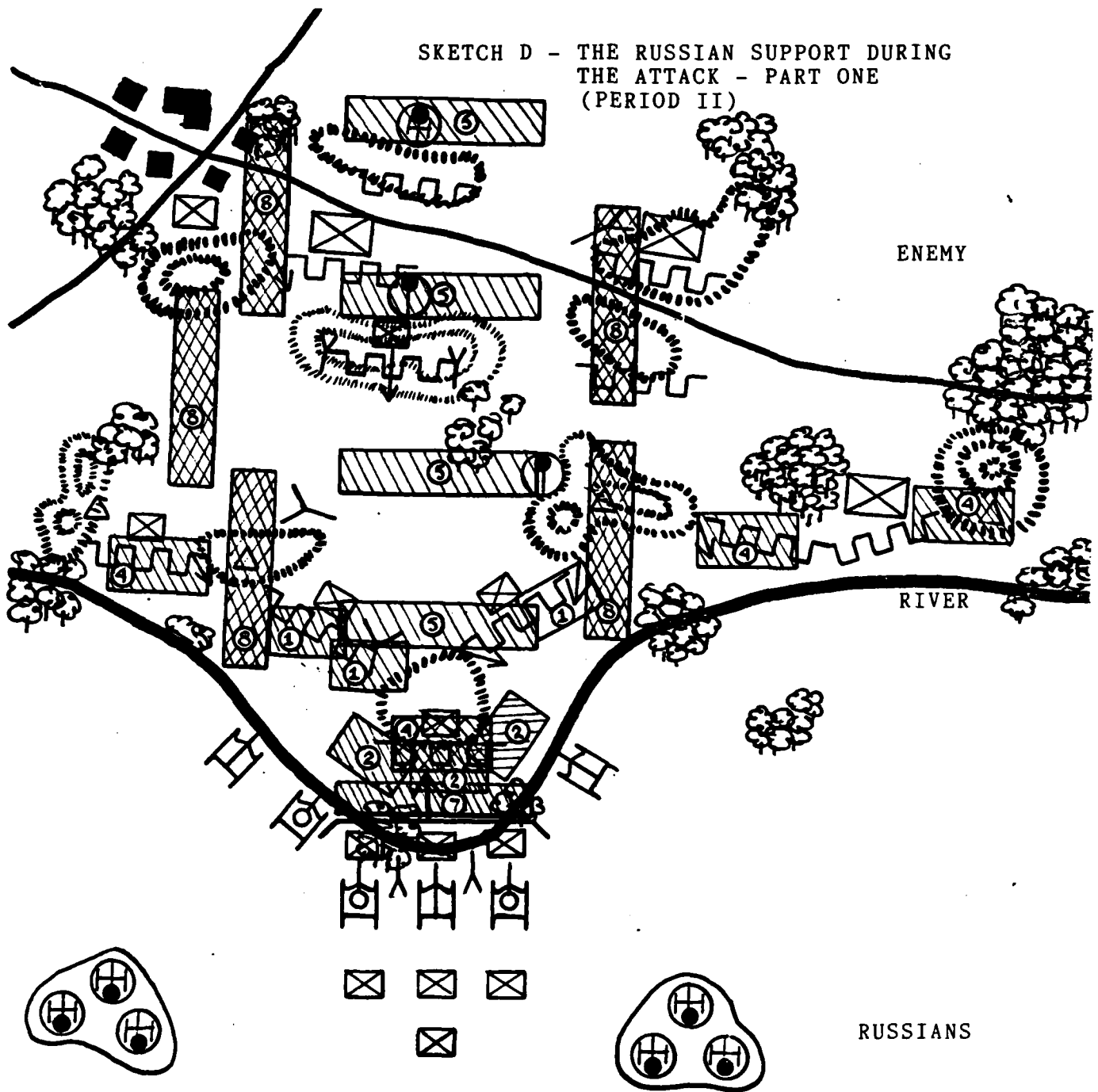
	HOWITZER BATTERY		TRENCHLINE		DIRECT AIMING FIRE
	MORTAR BATTERY		INFANTRY		DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK		FIRE ASSAULT
	TANK COMPANY		BRIDGE		FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE		SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE		MASSSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE		ROLLING BARRAGE FI
					STANDING BARRIER FIRE
					COUNTERBATTERY FIR

# SKETCH C - THE RUSSIAN PREPARATION (PERIOD I)



- |  |                        |  |                          |  |                                 |
|--|------------------------|--|--------------------------|--|---------------------------------|
|  | HOWITZER BATTERY       |  | TRENCHLINE               |  | ① DIRECT AIMING FIRE            |
|  | MORTAR BATTERY         |  | INFANTRY                 |  | ② DIRECT FIRE                   |
|  | ASSAULT GUN BATTERY    |  | LINE OF ATTACK           |  | ③ FIRE ASSAULT                  |
|  | TANK COMPANY           |  | BRIDGE                   |  | ④ FIRE CONCENTRATION            |
|  | ANTI-TANK GUN POSITION |  | SMOKE                    |  | ⑤ SUCCESSIVE FIRE CONCENTRATION |
|  | MACHINEGUN POSITION    |  | HIGH EXPLOSIVE           |  | ⑥ MASSED FIRE                   |
|  | OBSERVATION POST       |  | SMOKE AND HIGH EXPLOSIVE |  | ⑦ ROLLING BARRAGE FIRE          |
|  |                        |  |                          |  | ⑧ STANDING BARRIER FIRE         |
|  |                        |  |                          |  | ⑨ COUNTERBATTERY FIRE           |

SKETCH D - THE RUSSIAN SUPPORT DURING  
THE ATTACK - PART ONE  
(PERIOD II)



HOWITZER BATTERY



MORTAR BATTERY



ASSAULT GUN BATTERY



TANK COMPANY



ANTI-TANK GUN  
POSITION



MACHINEGUN  
POSITION



OBSERVATION POST



TRENCHLINE



INFANTRY



LINE OF ATTACK



BRIDGE



SMOKE



HIGH EXPLOSIVE



SMOKE AND HIGH  
EXPLOSIVE



① DIRECT AIMING FIRE



② DIRECT FIRE



③ FIRE ASSAULT



④ FIRE CONCENTRATION



⑤ SUCCESSIVE FIRE  
CONCENTRATION



⑥ MASSED FIRE



⑦ ROLLING BARRAGE FIR

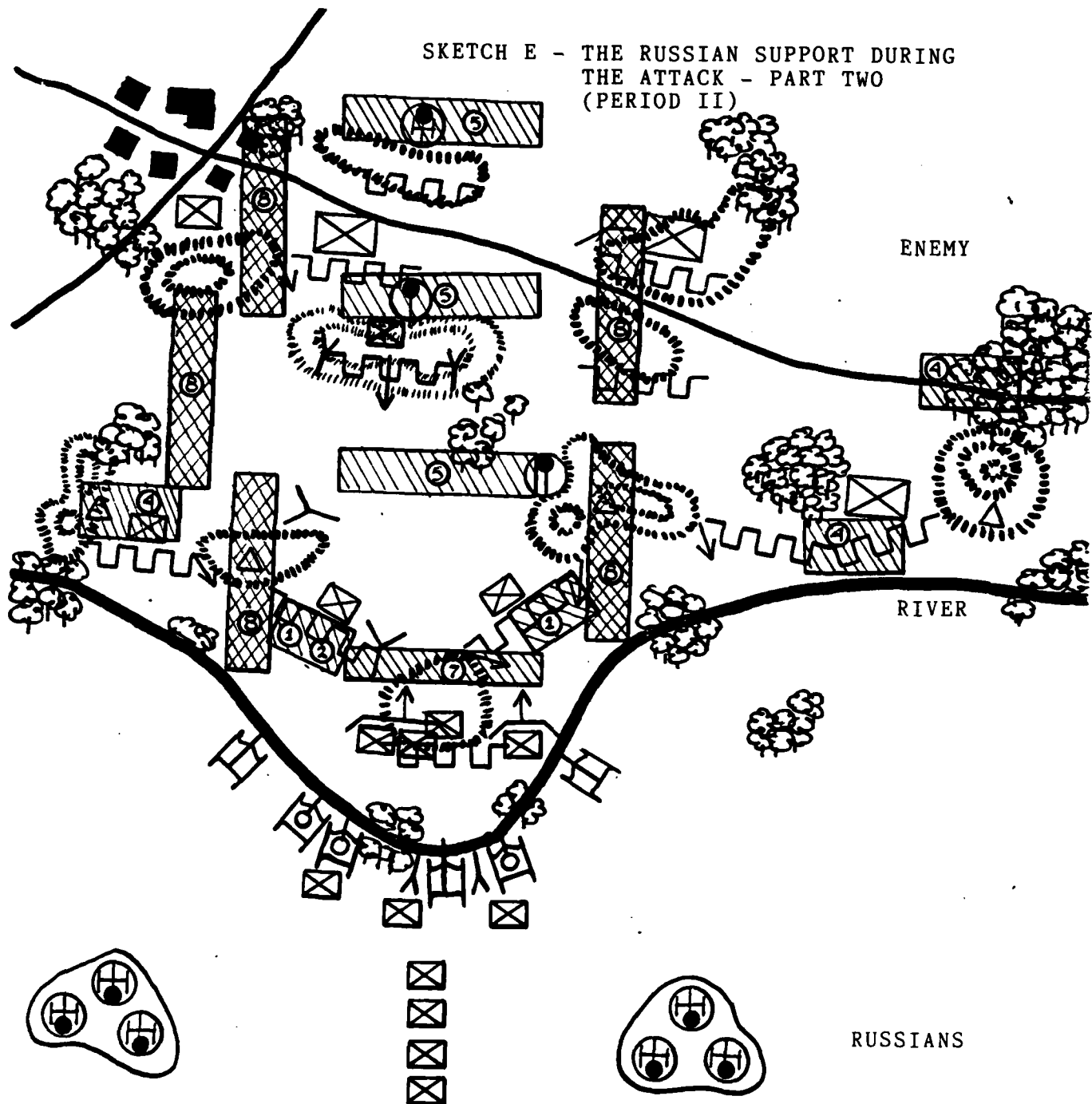


⑧ STANDING BARRIER  
FIRE



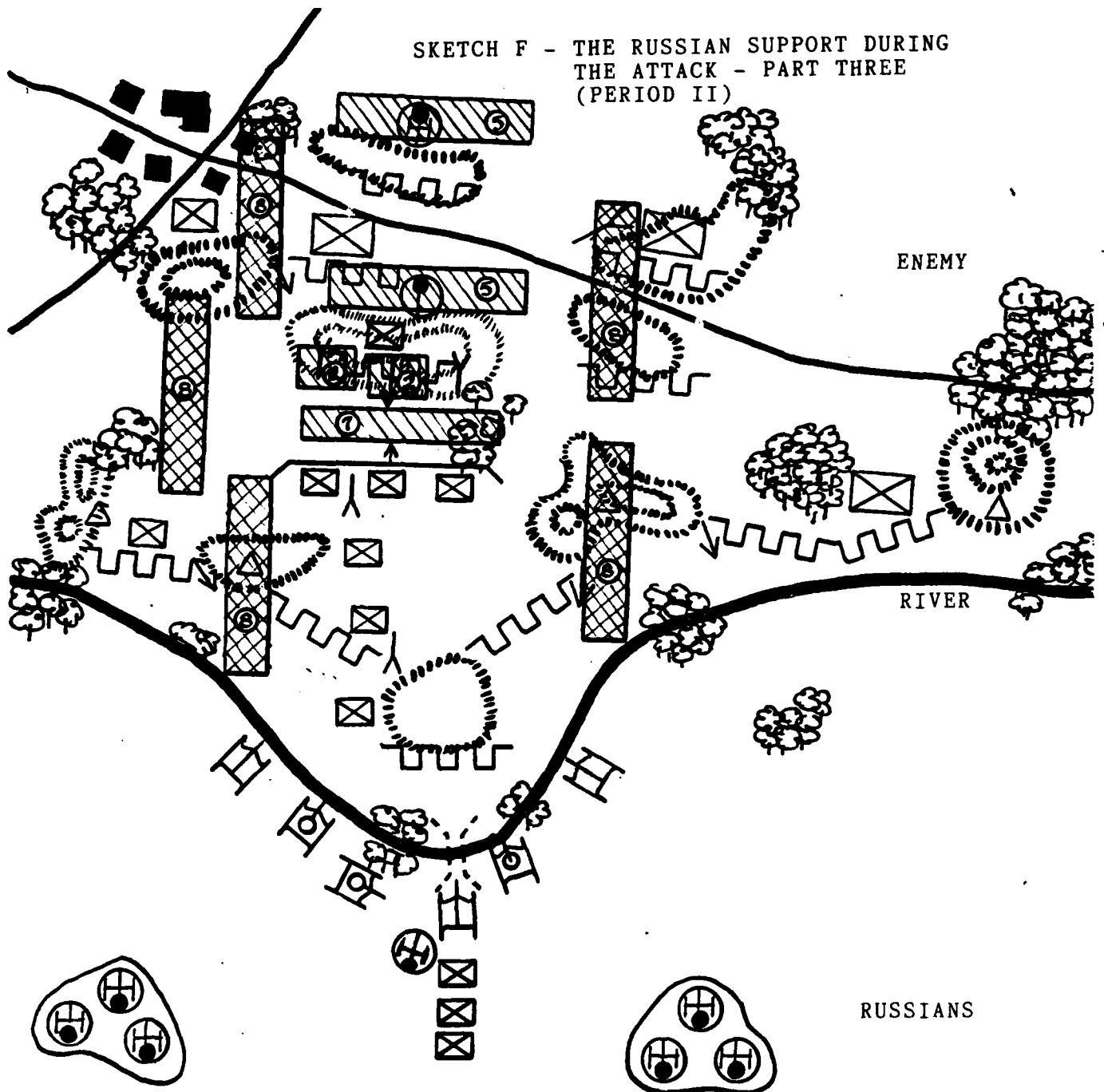
⑨ COUNTERBATTERY FIRE

SKETCH E - THE RUSSIAN SUPPORT DURING  
THE ATTACK - PART TWO  
(PERIOD II)



	HOWITZER BATTERY		TRENCHLINE		1 DIRECT AIMING FIRE
	MORTAR BATTERY		INFANTRY		2 DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK		3 FIRE ASSAULT
	TANK COMPANY		BRIDGE		4 FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE		5 SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE		6 MASSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE		7 ROLLING BARRAGE FIRE
					8 STANDING BARRIER FIRE
					9 COUNTERBATTERY FIRE

SKETCH F - THE RUSSIAN SUPPORT DURING  
THE ATTACK - PART THREE  
(PERIOD II)



HOWITZER BATTERY



MORTAR BATTERY



ASSAULT GUN BATTERY



TANK COMPANY



ANTI-TANK GUN  
POSITION



MACHINEGUN  
POSITION



OBSERVATION POST



TRENCHLINE



INFANTRY



LINE OF ATTACK



BRIDGE



SMOKE



HIGH EXPLOSIVE



SMOKE AND HIGH  
EXPLOSIVE

① DIRECT AIMING FIRE

② DIRECT FIRE

③ FIRE ASSAULT

④ FIRE CONCENTRATION

⑤ SUCCESSIVE FIRE  
CONCENTRATION

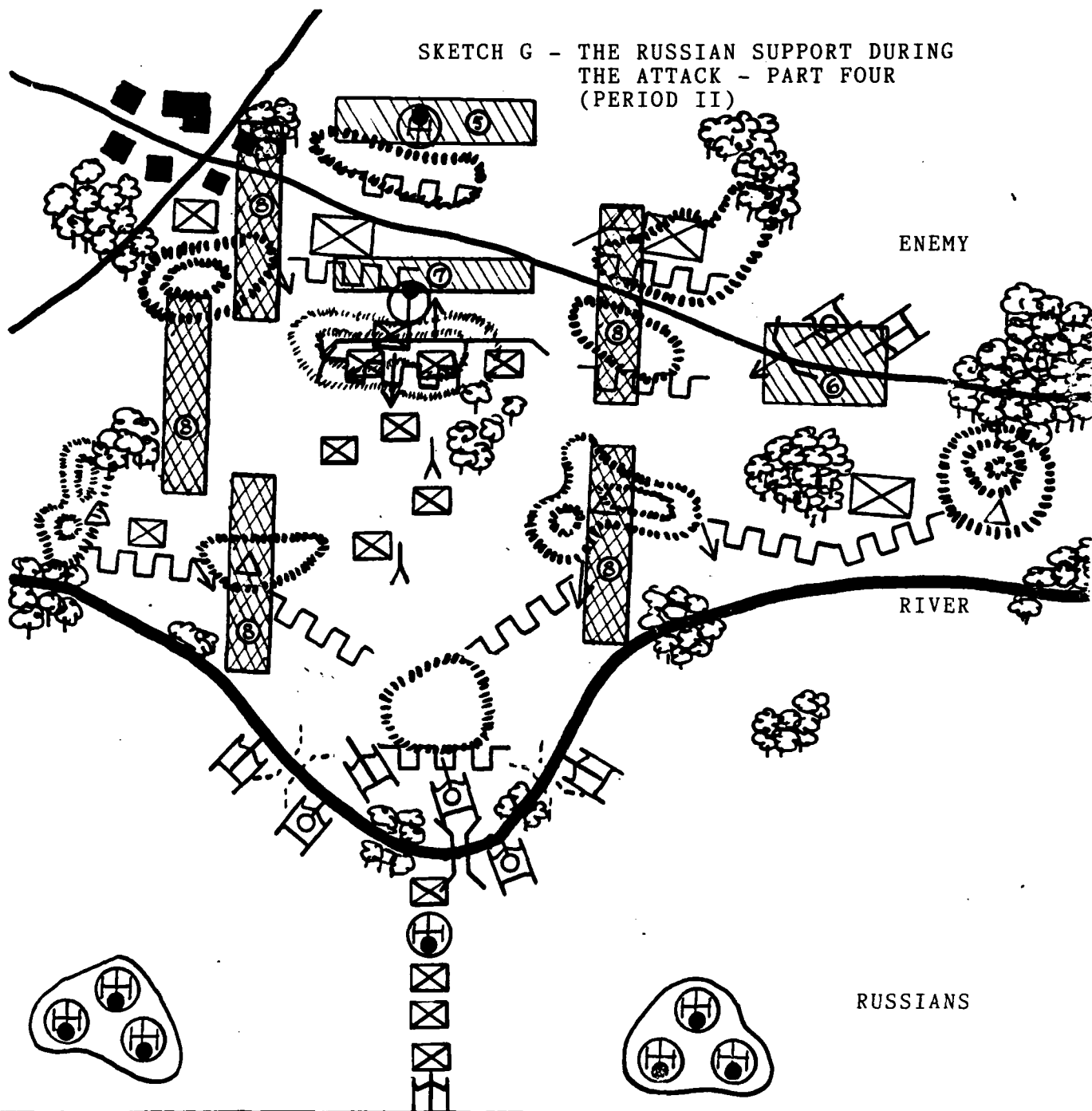
⑥ MASSED FIRE

⑦ ROLLING BARRAGE FIRE

⑧ STANDING BARRIER  
FIRE

⑨ COUNTERBATTERY FIRE

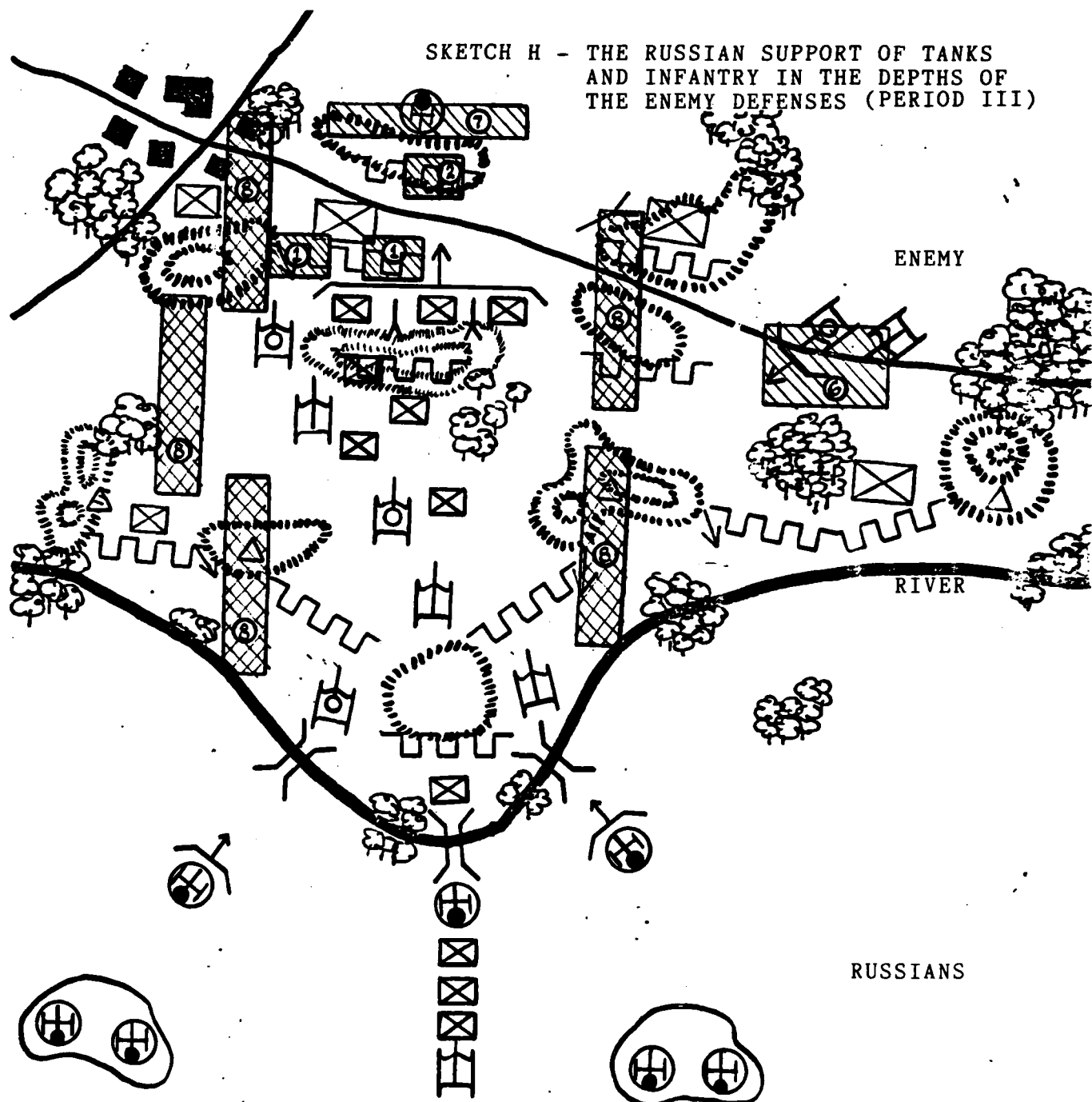
SKETCH G - THE RUSSIAN SUPPORT DURING  
THE ATTACK - PART FOUR  
(PERIOD II)



	HOWITZER BATTERY		TRENCHLINE		1 DIRECT AIMING FIRE
	MORTAR BATTERY		INFANTRY		2 DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK		3 FIRE ASSAULT
	TANK COMPANY		BRIDGE		4 FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE		5 SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE		6 MASSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE		7 ROLLING BARRAGE FIRE
					8 STANDING BARRIER FIRE
					9 COUNTERBATTERY FIRE

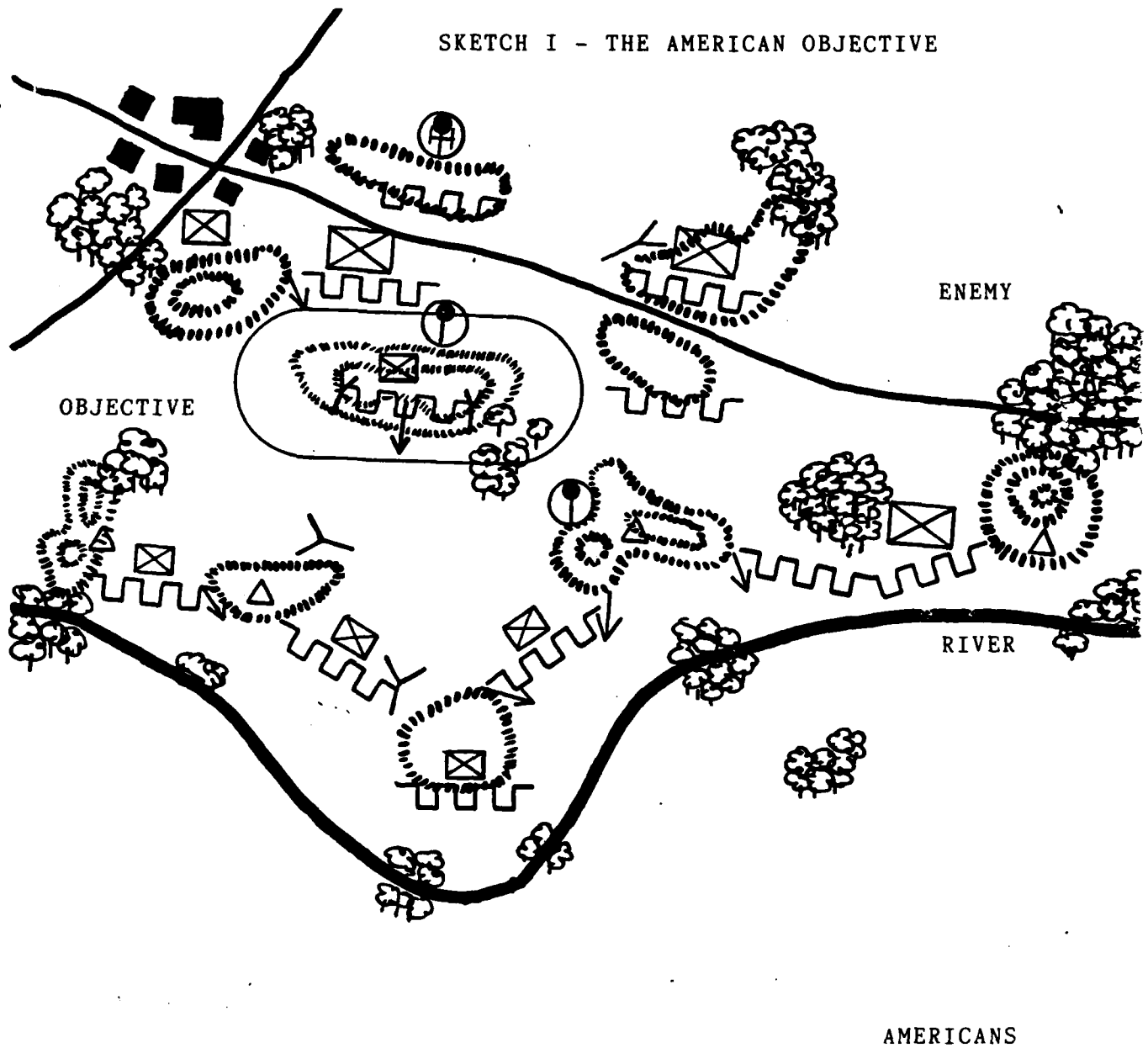


SKETCH H - THE RUSSIAN SUPPORT OF TANKS  
AND INFANTRY IN THE DEPTHS OF  
THE ENEMY DEFENSES (PERIOD III)



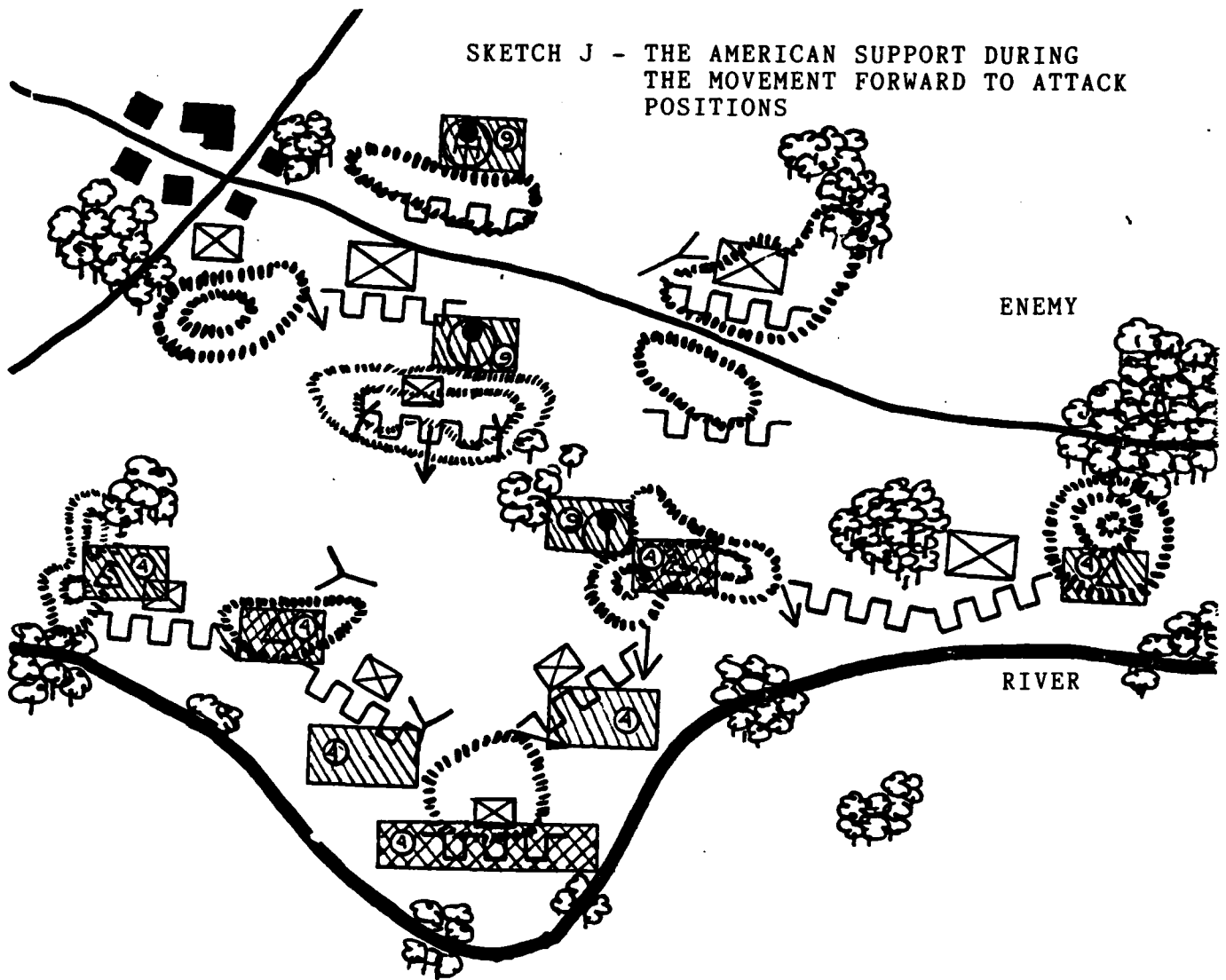
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	MORTAR BATTERY		INFANTRY		2 DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK		3 FIRE ASSAULT
	TANK COMPANY		BRIDGE		4 FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE		5 SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE		6 MASSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE		7 ROLLING BARRAGE FI
					8 STANDING BARRIER FIRE
					9 COUNTERBATTERY FIR















SKETCH I - THE AMERICAN OBJECTIVE



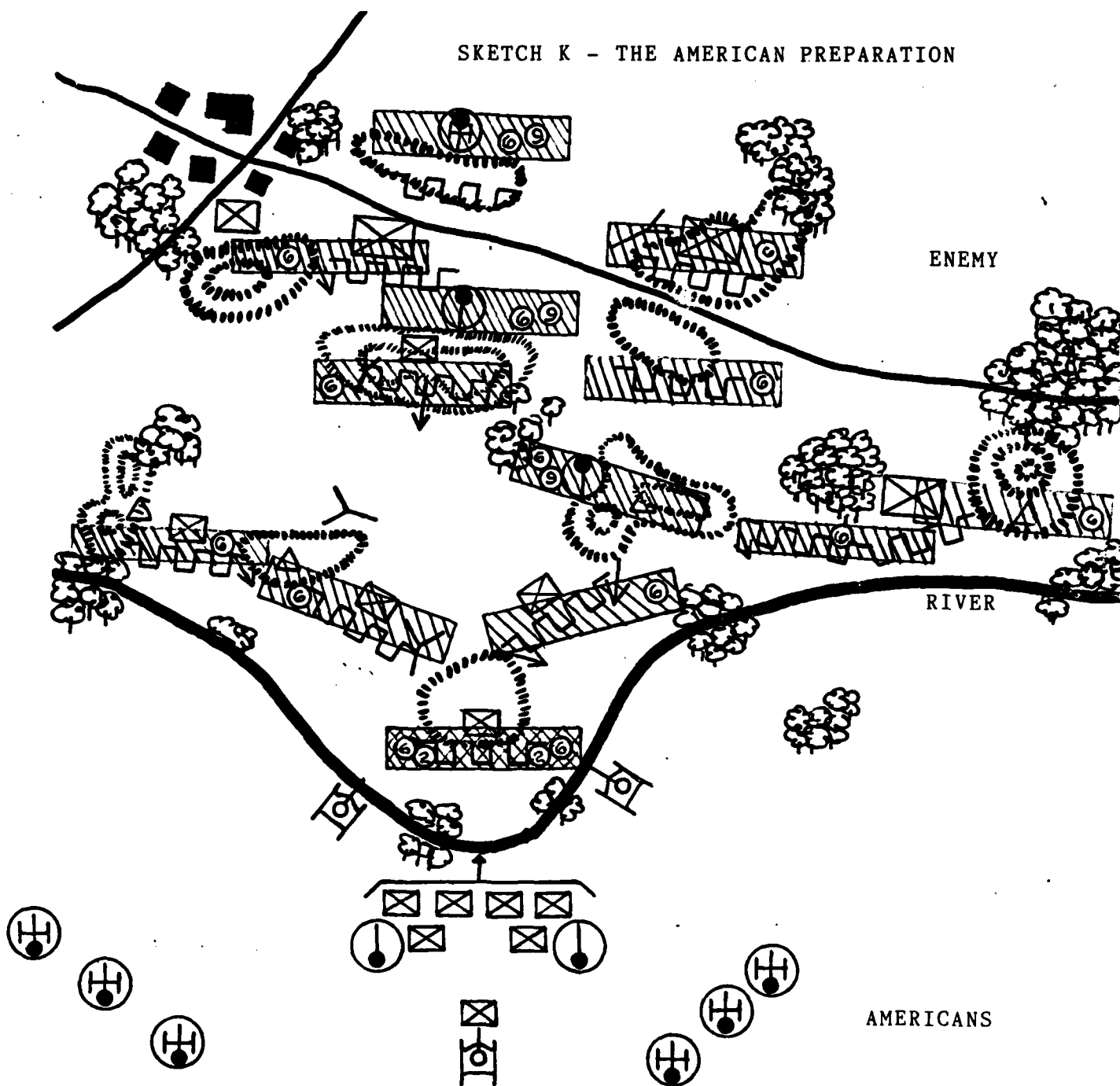
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	MORTAR BATTERY		INFANTRY		2 DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK		3 FIRE ASSAULT
	TANK COMPANY		BRIDGE		4 FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE		5 SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE		6 MASSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE		7 ROLLING BARRAGE FIRE
					8 STANDING BARRIER FIRE
					9 COUNTERBATTERY FIRE
























SKETCH J - THE AMERICAN SUPPORT DURING  
THE MOVEMENT FORWARD TO ATTACK  
POSITIONS



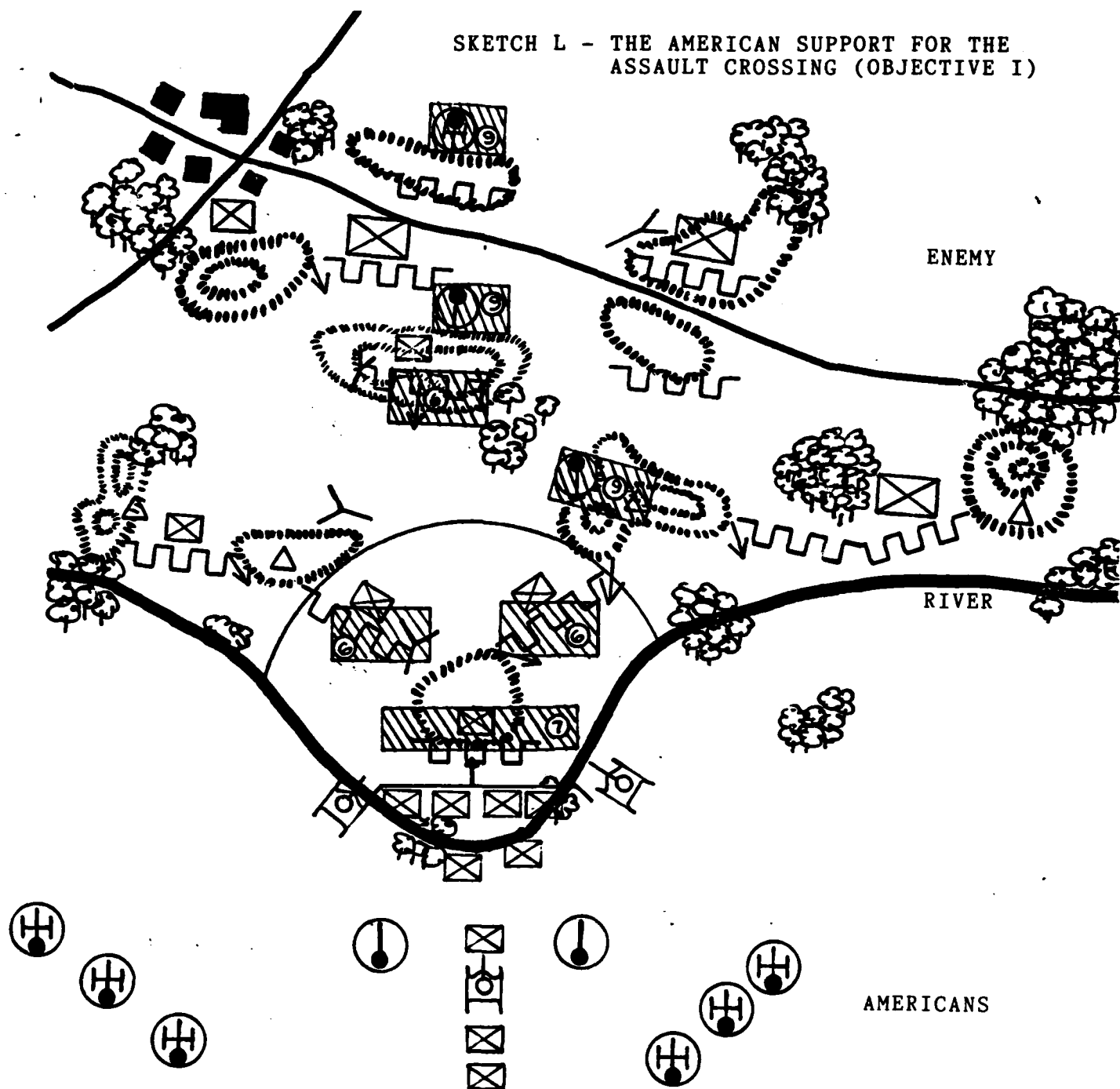
	HOWITZER BATTERY		TRENCHLINE	①	DIRECT AIMING FIRE
	MORTAR BATTERY		INFANTRY	②	DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK	③	FIRE ASSAULT
	TANK COMPANY		BRIDGE	④	FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE	⑤	SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE	⑥	MASSSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE	⑦	ROLLING BARRAGE FIRE
				⑧	STANDING BARRIER FIRE
				⑨	COUNTERBATTERY FIRE

SKETCH K - THE AMERICAN PREPARATION



	HOWITZER BATTERY		TRENCHLINE		1 DIRECT AIMING FIRE
	MORTAR BATTERY		INFANTRY		2 DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK		3 FIRE ASSAULT
	TANK COMPANY		BRIDGE		4 FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE		5 SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE		6 MASSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE		7 ROLLING BARRAGE FIRE
					8 STANDING BARRIER FIRE
					9 COUNTERBATTERY FIRE

SKETCH L - THE AMERICAN SUPPORT FOR THE  
ASSAULT CROSSING (OBJECTIVE I)



HOWITZER BATTERY



MORTAR BATTERY



ASSAULT GUN BATTERY



TANK COMPANY



ANTI-TANK GUN  
POSITION



MACHINEGUN  
POSITION



OBSERVATION POST



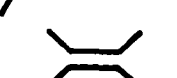
TRENCHLINE



INFANTRY



LINE OF ATTACK



BRIDGE



SMOKE



HIGH EXPLOSIVE



SMOKE AND HIGH  
EXPLOSIVE

① DIRECT AIMING FIRE

② DIRECT FIRE

③ FIRE ASSAULT

④ FIRE CONCENTRATION

⑤ SUCCESSIVE FIRE  
CONCENTRATION

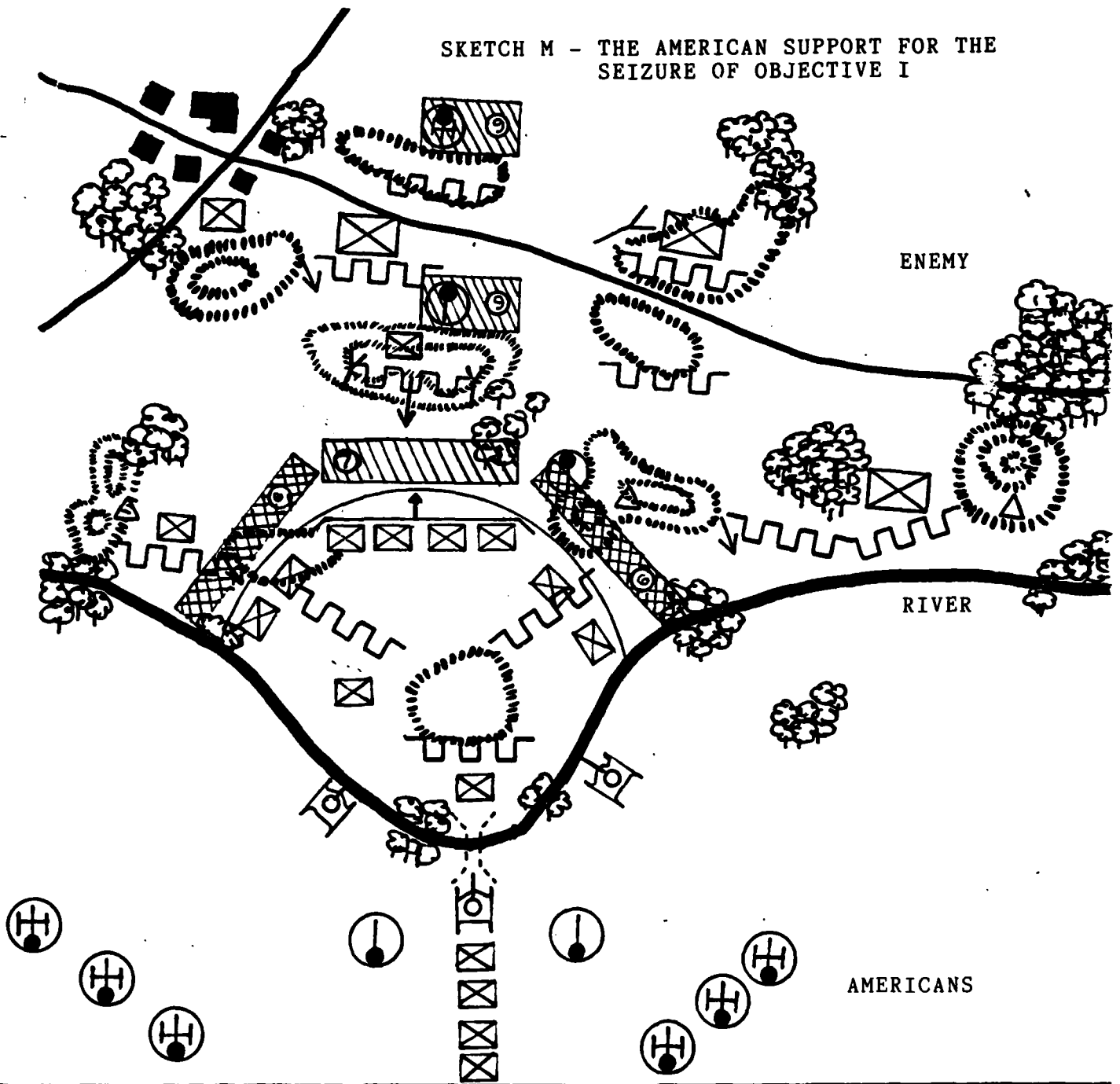
⑥ MASSED FIRE















⑦ ROLLING BARRAGE FIRE

⑧ STANDING BARRIER  
FIRE

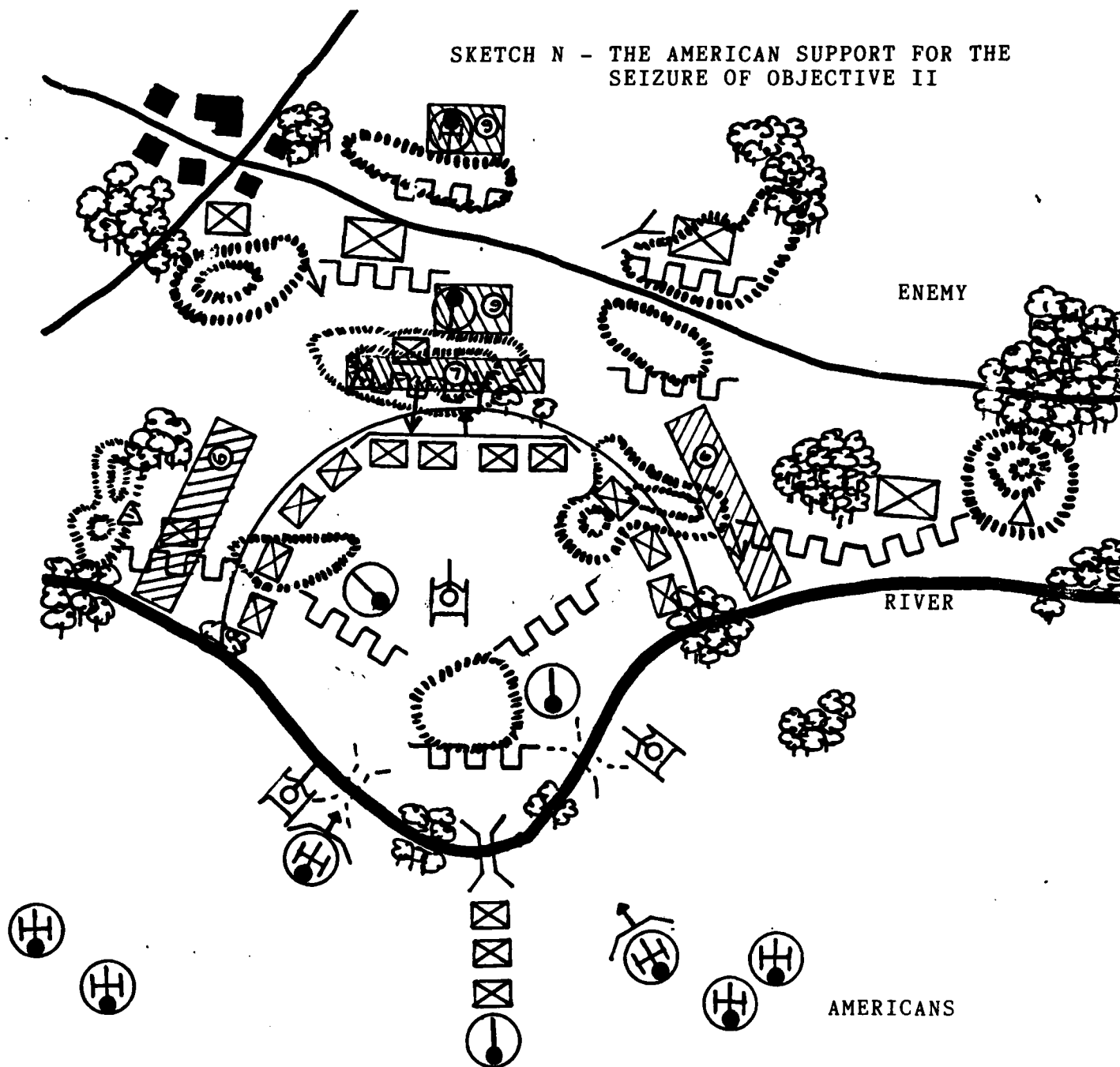
⑨ COUNTERBATTERY FIRE








SKETCH M - THE AMERICAN SUPPORT FOR THE SEIZURE OF OBJECTIVE I















	HOWITZER BATTERY		TRENCHLINE	①	DIRECT AIMING FIRE
	MORTAR BATTERY		INFANTRY	②	DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK	③	FIRE ASSAULT
	TANK COMPANY		BRIDGE	④	FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE	⑤	SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE	⑥	MASSSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE	⑦	ROLLING BARRAGE FIRE
				⑧	STANDING BARRIER FIRE
				⑨	COUNTERBATTERY FIRE

SKETCH N - THE AMERICAN SUPPORT FOR THE SEIZURE OF OBJECTIVE II

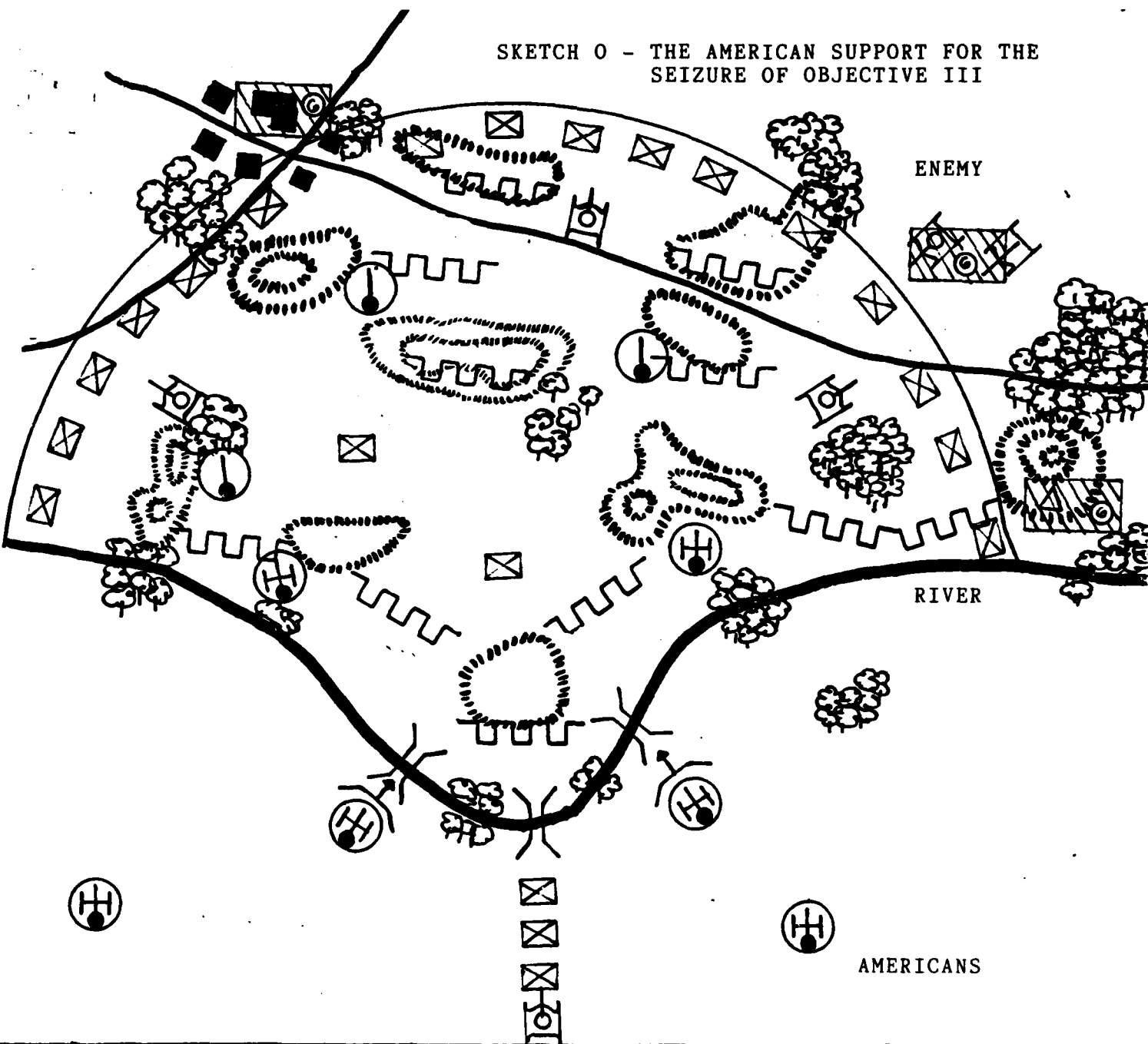


-  HOWITZER BATTERY
-  MORTAR BATTERY
-  ASSAULT GUN BATTERY
-  TANK COMPANY
-  ANTI-TANK GUN POSITION
-  MACHINEGUN POSITION
-  OBSERVATION POST

-  TRENCHLINE
-  INFANTRY
-  LINE OF ATTACK
-  BRIDGE
-  SMOKE
-  HIGH EXPLOSIVE
-  SMOKE AND HIGH EXPLOSIVE

-  1 DIRECT AIMING FIRE
-  2 DIRECT FIRE
-  3 FIRE ASSAULT
-  4 FIRE CONCENTRATION
-  5 SUCCESSIVE FIRE CONCENTRATION
-  6 MASSED FIRE
-  7 ROLLING BARRAGE FIRE
-  8 STANDING BARRIER FIRE
-  9 COUNTERBATTERY FIRE

SKETCH O - THE AMERICAN SUPPORT FOR THE SEIZURE OF OBJECTIVE III



	HOWITZER BATTERY		TRENCHLINE		DIRECT AIMING FIRE
	MORTAR BATTERY		INFANTRY		DIRECT FIRE
	ASSAULT GUN BATTERY		LINE OF ATTACK		FIRE ASSAULT
	TANK COMPANY		BRIDGE		FIRE CONCENTRATION
	ANTI-TANK GUN POSITION		SMOKE		SUCCESSIVE FIRE CONCENTRATION
	MACHINEGUN POSITION		HIGH EXPLOSIVE		MASSSED FIRE
	OBSERVATION POST		SMOKE AND HIGH EXPLOSIVE		ROLLING BARRAGE FIR
					STANDING BARRIER FIRE
					COUNTERBATTERY FIRE



**APPENDIX B**

**DEFINITION OF KEY**

**ARTILLERY TERMS**

**Assault Fire -** American low trajectory artillery fire normally conducted by one gun positioned in defilade and adjusted by an observer onto point targets such as caves in cliffs or individual weapons positions.

**Barrier Fire -** American and Russian continuous curtain of fire placed across the approach of enemy tanks and/or infantry. The three main types are standing, rolling, and strip. Also known as barrage fire.

**Controlling Fire -** Russian artillery fire directed on a target between fire assaults designed to limit the target's freedom of action to escape or resume combat. Usually one battery firing at variable rates conducts controlling fire.

**Counterbattery Fire -** American and Russian artillery fire on enemy artillery positions (sometimes includes mortars) to neutralize or destroy the positions.

**Destruction Fire -** American artillery fire conducted by usually one gun to destroy a weapon position or artillery fire on a target which has a 90% probability of inflicting 30% casualties.  
Russian artillery fire conducted by artillery units to inflict 75 to 100% casualties on a target. There is a 90% probability that a point target suffered serious damage and 50% of an area target suffered serious damage.

**Direct Aiming Fire -** American and Russian indirect artillery fire brought on target by the gunner sighting through his sight on the target. Also called direct lay and used extensively by mortars.

**Direct Fire -** American and Russian artillery fire which travels on a flat trajectory directly to the target fired by a gunner sighting through his sight on the target.

**Fire Assault -** Russian artillery fire which is a subelement of a preparation where one target is attacked by several battalions and is characterized by initial rapid fire attack, followed by systematic fire, and ending with intense rapid fire to destroy a target.

**Fire Concentration -** American and Russian artillery fire conducted by several units, depending on the size of the target to suppress the enemy.

**Harassment Fire -** American sporadic artillery fire conducted to slow movements or lower morale and reactions. Inflicts minute casualties.  
Russian sporadic artillery fire designed to inflict 20 to 50% casualties on a unit and prevent troops from moving. Definitely lowers morale.

**Maneuver By Fire -** Russian shifting of fires from one target to another without changing positions. Similar to American lifting and shifting.

**Massed Fire -** American and Russian technique of having several units fire on the same target simultaneously.

**Neutralization Fire -** American artillery fire on a target designed to have a 90% probability of inflicting 10% casualties on a target.

**On Call Fire -** American and Russian artillery fire which has been calculated and prepared and is fired on command of an observer, through the use of a signal or code.

**Rapid Fire -** Russian technique of firing the artillery piece at the designed maximum rate of fire, usually independently controlled by the gun chief. Equivalent to the American maximum rate of fire.

**Rolling Barrage -** American and Russian barrier artillery fire shifted to successive lines of resistance as the assault forces move forward.

**Scheduled Fire -** American and Russian artillery fire calculated and prepared to fire at a designated time.

**Successive Fire Concentrations -** Russian artillery fire placed sequentially on targets during specific phases of an attack. Similar to scheduled fires.

- Suppression Fire - American artillery fire which does not allow the target to be combat effective temporarily. Inflicts few casualties.  
Russian artillery fire which inflicts serious damage on a minimum of 30% of an area target and produces 51 to 74% casualties.
- Sustained Fire - American artillery fired at the designed rate which will allow long periods of firing without damaging the artillery piece.
- Systematic Fire - Russian artillery technique which has the gun crews fire every round in volleys on command. Similar to the American, "At My Command."
- Target Of Opportunity - American and Russian artillery fire placed on a target which was not planned prior to the receipt of the request/order to fire.

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